



PUBLISHED EVERY FRIDAY

AT

33, TOTHELL STREET, WESTMINSTER, LONDON, S.W.1

Telegraphic Address: "TRAZETTE PARL., LONDON"

Telephone No.: WHITEHALL 9233 (6 lines)

Annual subscription payable in advance and postage free:

British Isles and Abroad 2s. 5s. 0d.
Single Copies One Shilling

Registered at the General Post Office, London, as a Newspaper

VOL. 74 No. 14

FRIDAY, APRIL 4, 1941

CONTENTS

	PAGE
Editorials	381
Letters to the Editor	385
The Scrap Heap	385
Overseas Railway Affairs	386
Thoughts on a Curve Derailment	387
Electric Traction Section	389
Railway News Section	399
Personal	399
Transport Services and the War	401
Stock Market and Table	412

DIESEL RAILWAY TRACTION SUPPLEMENT

The April issue of THE RAILWAY GAZETTE Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price 1s.

NOTICE TO SUBSCRIBERS

Consequent on further paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list which will be dealt with in rotation in replacement of existing subscribers who do not renew their subscriptions.

Annual subscriptions are payable in advance and subscribers are advised to pay their renewal accounts before the expiration of the existing subscription, as the dispatch of copies will in all cases be stopped on expiration

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:—

Mondays to Fridays - 9.30 a.m. till 5.0 p.m.

The office is closed on Saturdays.

T. H. Watermeyer

M R. T. H. WATERMEYER retired on February 14 from the position of General Manager of South African Railways, Harbours, and Airways, that great 3 ft. 6 in. gauge 13,235-mile railway concern and its subsidiary undertakings, including the ports of Cape Town, Durban, East London, and Port Elizabeth, and a network of air services covering South and extending into Central Africa. Mr. Watermeyer gained distinction early as a civil engineer and was responsible for the survey of the famous Hex River Pass line, though probably his greatest engineering achievement was the survey and construction of the George—Oudtshoorn section through very difficult country. His general management has been outstanding, especially in his ardent and consistent advocacy of bringing all phases of transport under one Minister, and the improvement of railway operating conditions by regrading and realigning important lines, by the Reef electrification, and other measures. In his last three annual reports Mr. Watermeyer has repeatedly stressed the need for a Minister of Transport, who, with the guidance of an advisory council, would co-ordinate the control of all forms of transport in the Union, thus insuring cheap transit for marketing agricultural and base-metal products for the benefit of the country generally. He also recommended a directorate of railways as a corollary to this scheme. In other directions both Mr. and the late Mrs. Watermeyer have been keenly interested in social and welfare work, such as the S.A.R. & H. Children's Homes, St. John Ambulance activities, and Church missions.

* * * *

The Waterloo & City Tube

The Waterloo & City Railway modernisation scheme is one of the very few electrification projects brought to fruition in this country since the beginning of the war. As fully described in THE RAILWAY GAZETTE for November 15, 1940, practically everything except the type of current—600-volt d.c.—was swept away and replaced by new equipment, not least among which was the new rolling stock, the mechanical design of which forms a feature of this week's Electric Traction Section. The necessity of bringing this tube line thoroughly up to date was sponsored in the first place by the Southern Railway Traffic Department, at the head of which was then Mr. E. J. Missenden, the present General Manager. The complicated and sometimes delicate civil engineering work, including the re-positioning of the conductor rails to conform to Ministry of Transport requirements, was the responsibility of Mr. George Ellson, the Chief Engineer, and his staff, and the new electrical arrangements comprising power supply and distribution and equipment on the stock were the responsibility of Mr. Alfred Raworth, the present and first Chief Electrical Engineer of the Southern. Finally, the mechanical design of the motor-coaches and trailers and the supervision of their construction was carried out under the *egis* of Mr. O. V. S. Bulleid, the Chief Mechanical Engineer.

* * * *

Railway Operation in Wartime

At the luncheon of the Mansion House Association on Transport which is reported at page 408, Mr. W. H. Gaunt drew attention to a noteworthy change in the railway business—the present overriding need for highly efficient technical operation rather than commercial talent. Operation of traffic under every degree of pressure is vital and Mr. Gaunt expressed admiration for what was being done under present limitations, although he was inclined to be critical of inter-company traffic performances, and he argued that the planning and inter-operation of all the groups as one working whole should be compassed by bold operation brains. It is a fact, of course, that for the first time since the railways were grouped there is more than enough traffic for every carrier, and it is recognised that the present planning of the railway system of this country is probably at its weakest in points of interchange. The movement of traffic along unaccustomed routes and often against all previously expected

flows has thrown this matter into sharp relief. Much has been done to improve the facilities which exist for the interchange of traffic from one line to another, but few that existed in peacetime are capable of accommodating the volumes of traffic for which war conditions have been responsible. Marshalling yards and exchange sidings in particular are not always most advantageously situated for traffic flows altered by the present emergency. Nevertheless, the problem is being tackled, and obstructions to free flow removed, though this inevitably takes time.

* * * *

Overseas Railway Traffics

The improvement in Argentine railway traffics to which we called attention a fortnight ago continues on three of the principal undertakings. On the Buenos Ayres & Pacific in the 37th and 38th weeks of the financial year the advance has amounted to 361,000 pesos, the Buenos Ayres Western traffics are up by 329,000 pesos, and the increase on the Central Argentine has been as much as 480,900 pesos. The Buenos Ayres Great Southern increase of 211,000 pesos in the 38th week is partly offset by the decrease of 184,000 pesos in the 37th week. Antofagasta receipts for the 12 weeks of 1941 are down £28,060. Central Uruguay traffics in sterling are £37,399 higher to date, but are down in currency.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
Buenos Ayres & Pacific*	38th	1,956	+ 196	52,079	- 152
Buenos Ayres Great Southern*	38th	2,791	+ 211	82,230	- 8,364
Buenos Ayres Western*	38th	983	+ 246	28,207	- 1,618
Central Argentine*	38th	1,969	+ 344	58,235	- 9,481
		£	£	£	£
Canadian Pacific	12th	779,800	+ 254,800	7,968,600	+ 1,563,000
Bombay, Baroda & Central India	51st	328,500	+ 40,200	10,049,700	+ 1,146,900

* Traffic returns in thousands of pesos.

Gross earnings of the Canadian Pacific Railway for the first two months of 1941 were £5,758,400, an increase of £926,400, and the net earnings of £1,055,000 showed an improvement of £294,800.

* * * *

Annunciation of Station Names

There is one direction in which the popularity of the railway companies might easily be enhanced. Passengers travelling over lines with which they are unfamiliar have the greatest difficulty in recognising the station names, which, if announced at all by the station staffs, are too often distinguishable from other noises only by complete unintelligibility. Sufficiently perplexing in daylight, this state of affairs is far worse in the blackout, in which the long-distance passenger has often, perforce, to travel. It is then a familiar sight to see him or her get up, open the window, and, straining every nerve, try to catch the station name in order to avoid being over-carried. No one wants porters to greet the arrival of every train with an Oxford accent, but there is a very reasonable demand that they should, as a part of their training, be instructed in the clear annunciation of place-names, so that the latter will, at least, be easily recognisable. District officers should interest themselves in this matter. By so doing they would not only ease the burden of the blackout for passengers, but also tend to reduce both the periods of station stops and the over-carriage of passengers.

* * * *

A Job Requiring the Utmost Care

A delicate feat was successfully accomplished by Canadian National Railways engineers when they recently moved a 41,600-gallon cylindrical overhead water tank, complete with funnel-shaped pedestal and four steel legs, over a 13-mile length of line abounding in sharp curves and rock cuttings. The tank, which weighed about 50 tons, was 21 ft. in diameter and over 40 ft. high, including its 25-ft. steel legs. It was lifted from its foundations by two travelling cranes with 50-ft. jibs, and suspended between them throughout the

journey. A 48-ft. x 10-in. x 16-in. spacer beam and a cable were fixed between the crane buffer-beams to insure rigidity of spacing, and the cranes and vans forming the train were pushed by a locomotive over a line traversing rugged country. In the 13 miles, 7.3 miles (or 56 per cent.) of the distance were on curves up to 6 deg., and the length of 6-deg. (14½-ch.) curves aggregated two miles, the super-elevation being 6 in. In many of the rock cuttings the steel legs, spreading to a width of 17 ft. 11 in., barely cleared the sides, the clearance in one case being 1 in. on one side and 1½ in. on the other. In crossing a through-type plate girder bridge the load had to be lifted to clear the girders, but otherwise the bedplates of the legs hung 4 ft. above the sleepers. The ball indicator mast on the tank was 69 ft. above rail level, but only two sets of overhead wires had to be cut to let the load pass. With such curvature and cant, and with reverse curves often separated by almost imperceptible straights, this extremely top-heavy load had to be handled with the greatest care, and it is to the credit of all concerned that the journey was safely accomplished and the tank lowered on to its new foundations—without a positive stop being made *en route* except to cross trains—in under six hours from first hoisting to final lowering.

* * * *

Load Measuring Nine Times the Gauge

The Canadian National job just recorded reminds one of another, in some ways resembling it, which was carried out during the last war in Mesopotamia (Iraq). When the main line from Basra to Baghdad was being constructed, it was necessary to transport a 30-ft. diameter cylindrical overhead water tank to Ur junction (Ur of the Chaldees) for the locomotive depot there. It was a simple matter to send the tank from Basra up the Euphrates to Nasiriyah by steamer, but when unloaded at the latter town it was still nine miles along the branch line from Ur. Like the main line the branch is of metre gauge, so that the 30-ft. tank had to be hauled over it on a transverse base only ½ of its width, or with over 13 ft. of its width projecting on each side beyond the rails. A certain number of lineside objects had to be moved to provide the necessary clearance, and the road—which was only sand ballasted—had to be very carefully packed to insure that so cumbersome a load did not rock unduly, but the journey was accomplished in due course without mishap. In this instance the tank was loaded on a flat bogie truck. The corresponding load on the standard gauge would be over 40 ft. in diameter.

* * * *

The Simplon-Orient Express

In the days of crises before the outbreak of the war, the Simplon-Orient Express was curtailed in the west and the train then ran from August 30, 1939, between Istanbul and Milan. This lasted for little more than a week, however, for the decision was taken very quickly to extend the service through to Paris; the first departure from Paris was on September 7, and the first arrival there on September 9, 1939. Thereafter Paris remained the western terminus until the days immediately before the Italian declaration of war on Great Britain and France. Actually it was from May 27, 1940, that the Simplon-Orient Express was curtailed once more to run only between Istanbul and other Balkan points and Milan. In this form it continued to be maintained regularly with stock of the International Sleeping Car Company until the end of February, 1941. Then, at the time of acute Axis pressure on Bulgaria, the Nisch—Istanbul section was suspended, as frontier traffic between Jugoslavia and Bulgaria was confined to local trains upon which passengers were subjected to rigid inspection. Through traffic between Bulgaria, Greece, and Turkey ceased on March 13. This left the Italian and Jugoslav sections as the last remainder of the Simplon-Orient Express, and for practical purposes this famous train may be regarded as having been abandoned during the continuance of hostilities. Its establishment after the war of 1914-1919, with the object of providing a political link between Western Europe and the Balkans without touching Central European territory, was briefly described in our July 28, 1939, issue (page 125).

Railway Classification in U.S.A.

For statistical purposes, American railroads are divided into three categories. Class I lines are those with operating revenues exceeding \$1,000,000 annually; Class II those whose revenues range between \$1,000,000 and \$100,000; and Class III railways with annual revenues of less than \$100,000. In a separate class there are switching and terminal companies, operating union terminals, belt lines round cities, industrial, port, and stockyard railways, bridge and ferry companies, and various other minor concerns. In January, 1940, there were still 786 independent railways, comprising 137 in Class I (43 of which operated more than 1,000 miles of line), 201 in Class II, 238 in Class III, and 210 switching and terminal companies. By far the major part of the railway business, however, was in the hands of the Class I lines. These operated 93.7 per cent. of the total railway mileage, and represented 94.7 per cent. of the invested capital; they owned 94.1 per cent. of the locomotives, 98.2 per cent. of the wagons, and 98.4 per cent. of the passenger cars; Class I lines were responsible for 99.9 per cent. of the passenger mileage and 99.4 per cent. of the ton-mileage of freight; further, they employed 94.1 per cent. of the railway workers and paid 94.1 per cent. of the railway taxation. It is obvious from these figures that as yet grouping of railways has made but limited progress in the United States, though a number of the largest railways in the Class I group exercise control over various other companies in the same group, which rank as subsidiaries of the former.

* * * *

"Starting" or "Starter"?

The standard railway rule book recognises four principal classes of running signals—distant, home, starting and advanced starting. At one time a few lines, such as the Metropolitan, and Chatham & Dover, called their home signals "stop" signals, but this gradually fell into disuse and the term our Continental colleagues find so puzzling to translate found general acceptance. The terms "starter," "advanced starter," and "advance" are, however, commonly used in speaking and even in official documents at times, although really only colloquialisms not commanding formal sanction. We are unaware whether any railway here uses the term "starter" on its lever plates, but some may possibly do so. It is of interest to note that Indian documents and books constantly use it. Examination of the standard Indian rules appears to show that both "starting" and "starter" are regularly recognised, for they both appear, even in successive clauses of the same rule, here and there. We think that "starting" and "advanced starting" have the better sound; "advance" is, however, certainly a very convenient abbreviation.

* * * *

An Irrepressible Word

"Is this a gadget that I see before me, the handle toward my hand? Come let me clutch thee . . ." The foregoing adapted quotation is suggested to us by a picture recently published in a Sunday newspaper of one of the new L.N.E.R. signalwomen practising the exchange of train staffs, one of which is being courteously looped over her outstretched arm by a willing fireman (railway, not A.F.S.). Underneath is the caption, "Ellen Garner, first rail signalwoman in Britain, tests a 'gadget'." We thought the word "gadget" had relapsed into the obscurity in which we hope time in due course will bury other elastic terms of ephemeral value such as "Blitz," "Molotov," and "axis," and are glad that the Air Ministry has given a lead towards its suppression by ascribing the growing toll of enemy night bombers to "other devices," which effectively conveys "gadgets" to the unlearned mind without shocking the sense of euphony. It is a misfortune of the railways that their most commonplace equipment remains perpetually novel and surprising to a large section of the public. We hope that, in order to be universally understood, it may never be necessary to re-word a familiar railway notice as "Passengers are requested to cross the line by the gadget."

Railways in the War Effort

RECENT speeches by the chairmen of the four British main-line railway companies to their stockholders in annual meeting dealt with some aspects of the position of the British railways in the war effort. In America, of course, conditions have not as yet swung so completely away from normal as in this country, but with the increasing momentum of war production in the United States the conditions are rapidly becoming analogous to those of a belligerent state. In the maintenance and stimulation of that effort the railway factor is as fundamental as in Great Britain, and a recent address by Mr. M. J. Gormley, Executive Assistant of the Association of American Railroads, before the American Warehousemen's Association, showed how similar were the conditions prevailing in America and Great Britain. He was speaking on the railroads and national defence and pointed out that the former were always, from a traffic standpoint, in a state of national defence and fully equipped to handle promptly all traffic whether created by preparations for national defence or increased commerce. The railroads did not ask to be relieved of anything. They were the only means of transportation classed as common carrier and they could not escape responsibility for the movement of all traffic offered, regardless of its kind or conditions; they were, in fact, the only indispensable means of land transport in all and any circumstances.

All that was necessary to increase the main-line, yard, and terminal capacity to any extent was the addition of equipment. As a practical matter, railway capacity now was limited only to the ability of receivers promptly to unload cars and not use them for storage purposes. On this point he was in close agreement with Lord Stamp at the L.M.S.R. meeting and he went on to say that delays to wagons under load with consequent terminal congestion could be prevented either by the use of the railway embargo and permit system or by co-operation of all interests, individually and through adequate organisation. He also held that embargoes to prevent congestion should be used only as a last resort. Before the last war proper organisation had been lacking in the Army and Navy in the co-ordination of purchases and transportation. This defect had now been remedied and the Army and Navy, through the Army & Navy Munitions Board, were now thoroughly organised, and their regulations provided that in the shipment of materials for the Government wagons were not to be loaded until it was known that they could be unloaded at destination.

This problem of congestion on the lines and at the ports is one that is exercising the minds of all railway operating men at the moment, and the importance of evolving a means of its solution takes high place in the efforts of the administrations on both sides of the Atlantic. In this country a central organisation has been suggested to co-ordinate large-scale calls upon transportation. In the United States, through the organisation of the Association of American Railroads, check is kept on all heavy movement of traffic and by complete co-operation delays to equipment and congestion can be avoided. The congestion of traffic at the American ports in advance of and during the last war was the start of the general congestion that occurred during hostilities. With this in mind it was determined, in the autumn of 1939, that an organisation should be created to prevent a recurrence of those conditions. Special provision was made for dealing with export freight handled at New York and a joint committee was formed under the direction of the Maritime Association of New York, the General Managers' Association of New York, and the Association of American Railroads. This body has achieved marked success in keeping the movement of traffic at the port liquid, and, whereas previously it was not uncommon to have 150 lighters held under load over 48 hours, the number at the present time seldom exceeds 80, notwithstanding a heavy increase in the tonnage.

In addition to this organisation the Atlantic States Shippers' Advisory Board appointed a Port Transportation Committee to work with the Manager of Port Traffic, and the result has been a very heavy increase in the volume of tonnage handled. In order to keep defence materials moving smoothly the Manager of Military Transportation of the

Car Service Division has been furnished with information as to all contracts made by the War and Navy Departments for construction projects. Through co-operation with contractors and others the principle of not loading wagons until it is known that they could be unloaded promptly at destination is being carried out. Records show that the projects under way involving an estimated cost of over one billion dollars wagons arriving at points of construction have generally been unloaded on the average in less than the free time. It would appear therefore that in the United States at least there is appreciation of the paramount importance to transport of the principle that wagons must not be loaded beyond the ability of the receiver to unload promptly. In Great Britain this basic principle has yet to be understood fully by those diverse parties which imagine that a railway company can handle all traffic of whatever kind and volume without prior notice. No doubt, as a result of the recent statements by the chairmen of the British railways, attention is now being focussed on this point, but it is a matter that should have been tackled by the Government before the actual outbreak of hostilities. Now that the position has been stated so plainly there can be no excuse for further delay in a matter which is fundamental to the prosecution of the war. Lord Stamp has suggested the establishment of a central Government agency to aggregate and co-ordinate demands for transport, but no attempt has been made to explain any flaws in the plan he postulated or to put the scheme into operation. What is possible in the United States is essential to a country which forms a theatre of war.

* * * *

The "Railways" of Ancient Greece

NOW that modern Greece is so prominently in the news, it is of interest to recall that one of the contributions of ancient Greece to European civilisation was the specialised form of track corresponding broadly to the modern railway. Recent research* has tended to show that something comparable with a railway track was used in the days of Tiglath Pileser I, King of Assyria *circa* 1120-1105 B.C., and that the great trading community of Phoenicia, although commonly remembered for its attainments in navigation, also developed road communication in Syria. It was probably from the Phoenicians that Greece learned the significance of permanent way, and introduced it to Europe. Weber says† that, as the Greeks were actuated in the main by motives of religious and political culture rather than by considerations of commerce, their highways approximated more closely to railways than any previously built. Here is seen a trace of that functional efficiency that has always characterised permanent way. The Greeks were concerned mainly with the movement of large sacrificial vehicles carrying images of gods, and as this enabled a standard type of vehicle to be adopted, the highways could also assume the form of specialised track. In the main the permanent way consisted of parallel stone rails in which were cut ruts to accommodate the wheels. They were single-track ways, and at intervals there were passing loops known as *ektropoi* (which may be translated as turn-out). The priests, in order to facilitate the transport of their sacred chariots as widely as possible, insisted on a standard gauge for all such highways, and thus in all the remains of such tracks that have survived the gauge is stated by Weber to be uniform at about 1.63 metres (5 ft. 4 in.). There are numerous examples of grooved roads in Greece, notably at the gates of Athens on the road leading direct from the Piraeus to the Agora, on the main road from Sparta to Helos, and also in the neighbourhoods of Orchomenes and of Syracuse. Passing places may be seen on the Sparta-Helos road. Commercial use of a kind of railway in ancient Greece is exemplified by the *Diolkos* between Schoenus and Lechaeum, on which ships were drawn across the Isthmus of Corinth.

Similar rutways built by the Romans were examined with care by Monsieur H. Ferrand (who published his observations

in *La Nature* of May 6, 1905), and he gave the following dimensions: 1.44 metres (4 ft. 8 $\frac{1}{2}$ in.) centre to centre of the grooves; average width of grooves 0.06 metres (2 $\frac{1}{2}$ in.); maximum depth of grooves 0.07 metres (2 $\frac{1}{4}$ in.). Monsieur Florian Vallentin studied sections of an old Roman road in 1865 and again in 1878, and he gave the rutway gauge as 1.38 metre (4 ft. 6 $\frac{1}{2}$ in.), but subsequent investigation showed this to have been the width between the inner faces of the grooves. The old Greek highways, perfectly levelled, were studied by the German Ernst Curtius, who in 1855 presented a paper in Berlin on the construction of roads by the ancient Greeks. "When," he said, "the road bed consisted of bare rock or of stone covered only with a thin layer of earth, the Greeks did not bother in the slightest about making a good surface for the whole width of the thoroughfare. They were content with a rough levelling, and then for the wheels hollowed out grooves, which they prepared with the greatest care in order that vehicles might run securely and easily over a surface perfectly level at the bottom of the trench. Between the two grooves, in order to level the road bed whenever it was too rough or uneven, they spread sand or gravel." Another German, Herr Guhl, in his book on "The Life of the Greeks" (published in Berlin in 1864), stated as follows: "Even today Greece is traversed by roads in which grooves were artificially hollowed in the face of the rock for wheels of vehicles. By these means statues of gods and religious emblems could be moved conveniently from place to place. Between the ruts the road surface was levelled with sand or gravel."

An English traveller (William Mure, in "Journal of a Tour in Greece," 1842, Vol. II, p. 251) was no less precise in speaking of these ruts, observed by him along rocky roads. He said: "The term 'rut' must not here be understood in the sense of a hole or inequality worn by long use and neglected in a level road, but by a channel purposely scooped out at distances adapted to the ordinary span of a carriage, for the purpose of setting and directing the course of the wheels and lightening the way of the draught on rocky or precipitous ground in the same manner as our rail road. Some of these tracks of stone railway, for such they may in fact be called, are in a good state of preservation, chiefly where excavated in strata of solid rock." A road which was not sufficiently frequented to need passing places was termed "unbending" and Hesychius has preserved for us this definition: "an unbending road is one which has no turn-outs." Thus we see expressed, on a Greek inscription, the wish of a "secure groove" or "passage without harm" to a friend starting on a journey.* Monsieur Caillerier, in a lecture delivered in Paris in 1869, showed that this wish was by no means purposeless, since it was an unlucky quarrel about priority of passage along a groove that had caused the tragic death of Laius, slain by his son Oedipus, who failed to recognise him.

A Lili Réthi Exhibition

Our American contemporary, *Mechanical Engineering*, of February, 1941, reports that during December last Miss Lili Réthi held an exhibition of her work at the Architectural League of New York. In addition to recent drawings of construction and architectural subjects made in America, she exhibited several pencil drawings made in England and on the Continent. It will be recalled that Miss Réthi, who has a remarkable gift for imparting life to pictures of machinery and constructional work, painted some notable posters a year or two ago for the L.M.S.R. and the London G.P.O. tube railway, and they are still to be seen here and there adorning walls in this country. She also made sketches for a booklet issued by the L.N.E.R., and has done numerous drawings of engineering works on the Continent, including a poster of the construction of the Little Belt bridge in Denmark, which was exhibited at the opening of the bridge in 1935. At the present time Miss Réthi's work is to be seen on the covers of several of the McGraw-Hill publications.

* See "The Evolution of Railways," by Charles E. Lee. London: THE RAILWAY GAZETTE (1937).

† "Die Schule des Eisenbahnwesens," by Freiherr Carl Philipp Max Maria von Weber. Leipzig, 1857.

* "Corpus inscriptionum Graecarum," No. 3276, Vol. II, page 749

LETTERS TO THE EDITOR

(*The Editor is not responsible for the opinions of correspondents*)

The L.M.S.R. Meeting

284, Nantwich Road, Crewe, March 21
TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—In THE RAILWAY GAZETTE of March 14 (page 294) it is reported that at the L.M.S.R. meeting of March 7 I asked why it was that sleepers laid in the Rugby and Lincoln line between the 36 and 38 posts in 1926, were taken out in 1935 after 9 years' service. This is incorrect. What I asked was why creosoted *Pinus sylvestris* sleepers, creosoted by the full cell process, and which were laid in the up fast line of the London and Rugby line between the 36 and 38 mile posts in 1926, were taken out and renewed on account of decay in 1935 after a life of only 9 years.

Yours faithfully,

R. CHAMBERLAIN

Frost and Electric Railways

Railway Research Service,
4, Cowley Street, S.W.1, March 10
TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—The article in your March 7 issue (Electric Traction Section) outlining the contents of an article by Mr. H. F. Brown, Assistant Electrical Engineer, New York, New Haven & Hartford Railroad, dealing with the removing of sleet from

overhead wires on electrified sections in the New York zone, was of great interest.

Your readers may like to learn that on January 16 the electrified sections around New York experienced unique troubles from this cause and your contemporary, the *Railway Age*, in its issue of January 25 devotes some space to explaining the hold up which occurred.

Thus the New Haven's Pilgrim was stalled on Hell Gate bridge when heavy sleet caused the collapse of high-tension wires, and a steam locomotive had to be used to remove the train to Long Island City. A New Haven suburban electric ran into similar trouble at La Rochelle, New York, but the most serious delays occurred on the electrified suburban services of the Lackawanna Railroad where the pantographs of the multiple-unit suburban trains were frozen into position and therefore could not make contact with the higher wire between Hoboken and Newark. So far as was possible steam-hauled services were hurriedly organised to get home the 20,000 or so Lackawanna passengers, who, as a consequence of the freeze, were stranded at that railway's Hoboken station.

Such conditions are very rare in the New York area, but they demonstrate the importance of the question dealt with in Mr. Brown's article in the *Railway Electrical Engineer*.

Yours faithfully,

C. E. R. SHERRINGTON
Secretary.

THE SCRAP HEAP

APHORISMS BY THE MINISTER OF TRANSPORT

A few extracts from Colonel Moore-Brabazon's speech at the annual luncheon of the Mansion House Association on Transport:—

Mr. Gaunt touched lightly on post-war planning and I thought perhaps he would pass on to finance and the gold standard—but then he sat down.

The tragedy is that this robust man (Mr. Gaunt) is followed by a most ephemeral body, the Minister of Transport—here today and gone tomorrow.

A transport organisation which is 59 years old has to be treated with grave respect. I want to ask you this question, why were you born. I should have liked to have listened to your deliberations right through the ages, and wonder at what stage you decided that the motorcar had come to stay.

When the Ministry of Transport created the "C" carrier it never contemplated such a large "C" carrier as Lyons; it is almost an ocean carrier.

The people I have met in the transport world at public functions have been extraordinarily stuffy. They always expect from me something I am not going to give them.

Civil servants in general are a very fine race. Unlike politicians they are quite incapable of appreciating what is frightfully important and what is not frightfully important. Consequently they will give just as much trouble to

something which involved 2s. 6d. as to something involving £1,000,000.

The great Frank Pick is wandering up and down the country consorting with barges.

Railways are like politicians, they do extraordinarily good work and are cursed by everyone.

*

*

*

What once was probably the smallest public tramway in Scotland has recently been closed by its owner, the L.N.E.R., after an existence of over 40 years. In June, 1899, the Cruden Bay hotel tramway, connecting the former Great North of Scotland Railway station and hotel, was opened for the conveyance of visitors and their luggage between the two points, a distance of barely a mile. The track was comprised of bull-head rails and built to a gauge of 3 ft. 6½ in. Electricity for operating the tramway was generated near the hotel and distributed by an overhead wire. The rolling stock was all built at the Kittybrewster works of the Great North of Scotland Railway in 1899 and consisted of two electric tramway cars, each seating 16 passengers and containing a driver's platform each end, an open trailer car for the carriage of coal, and two bogie cars for conveying boilers and other heavy articles. After the withdrawal of passenger train services from the Cruden Bay branch on October 31, 1932, and introduction of a bus service direct to Aberdeen, the tramway ceased to carry passengers and was

used solely for the transport of laundry and other goods to and from the hotel. Even this work has now been taken over by road transport and the whole of the tramway and its vehicles are being removed and disposed of as scrap by the L.N.E.R.

* * *
"CONTACTED"

I was glad to see Mr. J. Maynard Saunders's letter in your issue to-day. It was indeed startling, to say the least, to hear "this new and horrible word" used by one of the B.B.C. announcers. I recently had a letter from a public official in which he said: "I have pleasure in enclosing names and addresses of persons . . . and would suggest you contact them. . . . I have also asked Mr. — to contact you." What on earth has happened to such words as "meet" or "write to"?—*The Rev. Alfred J. Toyne in a letter to "The Times."*

The word to "contact" is beginning to be freely used in conversation and has a definite *raison d'être*. It is not, as Mr. Toyne suggests in his letter on March 28, a mere synonym for "to meet" or "to write to"; it covers both those methods of making contact, and it covers telephoning as well. "You had better contact him yourself" is a modern way of saying: "You had better get into touch with him by whatever method suits you best"—a good terse way of saying it. In particular it covers telephoning as no other word does. A living language keeps up with mechanical developments.—*A. L. K. in a letter to "The Times."*

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

CANADA

Lachine Canal Bridge, Montreal, C.N.R.

Work was begun after the canal had frozen over in December upon the erection of the steelwork of the vertical lift bridge which the Canadian National Railways are constructing across the Lachine Canal at the foot of Murray Street near Wellington Street tunnel, Montreal. So rapid has been the progress of the work, however, that it is expected to be completed by the end of March, and the new bridge should be in service by April 1.

This important bridge, though designed to carry four tracks, will at first be laid with two only, but it forms a link in the vital communications now under construction in connection with the new C.N.R. terminal station. There are two separate lifting spans to allow east- and west-bound boat traffic, respectively, to pass. The estimated cost of the bridge is about \$1,000,000, and it will carry main line traffic to and from the west, south, and south-east.

The old Lachine Canal bridge is being moved 32 ft. further west in order to allow room for its swing span to open for the passage of boats, and it will continue to carry traffic to and from the harbour lines.

NEWFOUNDLAND

Scheme for Rehabilitation of Bridges

The main line of the Newfoundland (Government) Railway runs from St. John on the east coast to Port aux Basques at the south-western extremity of the island, a distance of 547 miles. It is of 3 ft. 6 in. gauge and, together with numerous branches, was constructed by various companies from time to time between 1893 and 1897, but was acquired by the Government in 1923. There are 195 bridges on the main line—which is laid throughout with 70-lb. rails—and they vary from 10-ft. clear plate-girder spans to 228-ft. through-truss spans, of which four comprise the Exploits river bridge near Bishop's Falls.

Mr. P. C. Pratley was engaged some time ago as Consulting Engineer to the Newfoundland Railway, and as a result of a detailed field inspection in the summer of 1939, drew up a programme of bridge rehabilitation covering seven or eight seasons' work which he has described in a paper presented recently to the Institution of Structural Engineers. In it he mentions that, apart from two powerful 74-ton rotary snow ploughs, the heaviest vehicles on the line are seven 2-8-2 locomotives, two of which were built by the American Locomotive Company of Schenectady, and the other five by the North British Locomotive Co. Ltd. of Glasgow. The heaviest loading at speed for which

the bridges are being rebuilt is, therefore, two of the 2-8-2's coupled together weighing 222 tons in all spread over a total wheelbase of 122 ft. 7 in. and a train loading of 1,500 lb. a foot run. The maximum axle load, apart from that of the ploughs which are run at only low speeds, is the 14·6 tons of the 2-8-2's.

There are also several classes of Pacific locomotives, the heaviest weighing 110 tons, and the heaviest coaches are 40-ton sleeping cars measuring 64 ft. in length; freight cars are mainly 30-ton box cars, weighing about 17 tons tare, and ore cars weighing some 36 tons gross.

Condition of Bridges and Investigations Conducted

Between 1914 and 1923 maintenance had been rather neglected, and the depression years had not helped to restore it to a high level. Masonry piers and abutments of bridges were found to have moved as a result of undermining or earth pressure, girder bearings in the form of roller nests had become distorted, and metal generally was corroded by salt water and atmosphere. In the repair plan great pains were taken to fix a suitable allowance for impact, and every instance of probable overstressing was carefully investigated. The largest single work recommended was the entire reconstruction of the bridge over the St. George's river on the west coast, though alternative recommendations were also made.

BOLIVIA

Trans-continental Construction

Steady progress is being made with the construction of the Trans-continental line that will eventually connect Santos in Brazil with Arica in Chile. [This line was described in our issue of January 24 last.—Ed., R.G.] The new construction still to be completed is in Bolivian territory between Arroyo de Concepcion and Santa Cruz. The first 111 km. from Arroyo de Concepcion to El Carmen are now nearing completion, and tenders have been accepted for the second and third sections up to São Jose de Chiquitos (km. 404); also the contract for the fourth and last section to Santa Cruz (km. 680) is reported to be on the point of being let.

In addition, a branch line is projected to link up the Corumba—Santa Cruz section with Grether Port on the Ichilo river, a tributary of the Amazon; a connection will thus be made with the Madeira-Mamoré Railway.

The Santa Cruz—Yucuiba connection with Argentina [referred to in our issue of June 14 last.—Ed., R.G.] and the Sucre—Camiri and Sucre—Villa Villa proposed lines will prove invaluable in opening up the Bolivian oilfields. The

initial 62 miles of the Yucuiba line, from that station to Villa Montes, are likely to be completed within a year.

VENEZUELA

New 2-ft. Gauge Extension

An extension of the Bolívar Railway system some 60 km. in length is under construction from Palma Sola to El Palito; it is of 2-ft. gauge, and is included in the Government's five-year public works programme of July, 1939.

ECUADOR

Railway Constructions

Two railway extensions are at present under construction (1) that from Ibarra to San Lorenzo, a distance of 120 km., of the Quito-Esmeraldas Railway, and (2) the Sibambe—Cuenca extension. Prior to December, 1937, a Swiss company was constructing (1), but its contract was then cancelled and the work was continued by the Government; during 1940 about \$150,000 were spent on this construction. Meanwhile (2) is being gradually extended from Tambo to Biblán in the direction of Cuenca.

CHILE

Proposed New Railways

The *Diario Oficial* of November 30, 1940, publishes Law No. 6,766, dated November 27, authorising the construction of six new railways in the southern section of the country. The cost is estimated at 136,000,000 pesos, of which the Government guarantees half, to be charged to the national exchequer in annual instalments in the budgets of 1941-45 inclusive. The remaining half of the capital is to be derived from a tax of five per mil. on the properties adjoining the lines of the new railways, and also by a surcharge of 20 per cent. on the rates and fares of the new lines over and above the present tariffs in force throughout the Southern Section of the State Railways.

DENMARK

Electrification of Slangerup Line

The question of electrifying the Slangerup line has been under discussion for some years and the Copenhagen Municipality has announced its willingness to share the cost. Heavy civil engineering works are involved and the arrangements for providing power are still being considered.

U.S.S.R.

Neldy-Jezkazgan Railway Opened

Messages from Alma-Ata (Kazakhstan) report the opening of a new railway between Neldy and Jezkazgan, a distance of 260 miles. This line connects the rich Jezkazgan copper deposits with the main railway lines of the country, and is destined to play an important part in the economic development of the adjoining districts.

THOUGHTS ON A CURVE DERAILMENT

A discussion of the circumstances in which a New York Central New York to Chicago express was derailed on a sharp curve

DERAILMENTS of express trains on curves are fortunately rare, and when they occur always arouse special interest because the behaviour of vehicles on curved track increases in importance with the tendency towards faster travel. The last serious curve derailment was that of a New York-Chicago express on the New York Central System at Little Falls, N.Y., on April 19, 1940. The circumstances of this accident, so far as they were then known to us, were recorded in our issue of May 24 (pp. 726 and 740). A summary of the report of the Interstate Commerce Commission's Bureau of Safety on the accident appeared in our issue of August 9 (p. 153). By the kindness of Mr. R. D. Starbuck, Executive Vice-President of the New York Central System, we have since had the opportunity of studying the report.

It may be recalled that the express concerned, Train 19, consisting of a 4-6-4 locomotive hauling 15 cars, was derailed on a 7-deg. 24-min. (12-ch.) curve, 856 ft. long, over which it was travelling at a speed 14 m.p.h. greater than the stipulated limit of 45 m.p.h. A curious feature of this sharp

the air brake. Exactly what condition of affairs arose immediately afterwards is not revealed in the report, beyond the fact that the engine left the rails, overturned, and was brought to a stop in about 400 ft. by a rock wall.

The curve had a cant of 8 in. and was introduced by a transition about 200 ft. long. There was a curve lubricator situated on the outside rail some distance before the curve. The report mentions a "maximum safe speed" of 48 m.p.h., i.e., 3 m.p.h. more than the prescribed restriction, and that the normal centre of gravity of the locomotive was 77.66 in. above rail level. The height of the centre of gravity of the tender is not given. The report also mentions that the overturning speed on this curve, as indicated by A.R.E.A. tables, and presumably neglecting any effect of the vertical curve, was 78 m.p.h., and that the engine left the rails after it had traversed 458 ft. or a little more than half the length of the curve, from which it is not unreasonable to conclude that the train might have rounded the full length of the curve at 59 m.p.h. with no more serious mishap than

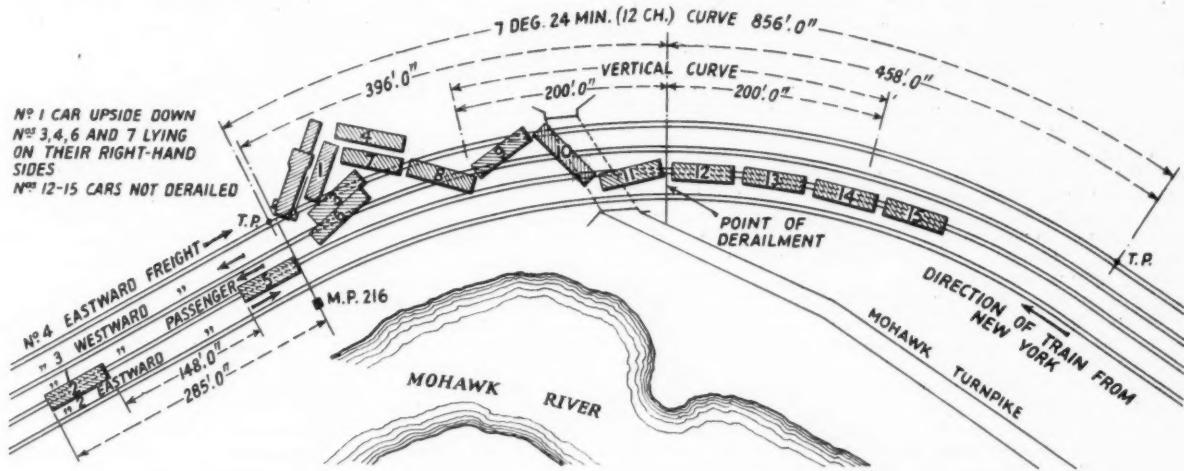


Diagram of conditions at Little Falls curve after derailment of New York-Chicago express, April 19, 1940
(See also photograph reproduced on page 397)

curve is a vertical curve 400 ft. long, though of unstated radius, at the top of the grade, in the middle of it, a fact which might reduce the minimum overturning velocity. The conclusion of the report was that the cause of the accident was "excessive speed on a sharp curve combined with a run-in of slack resulting from the throttle being closed suddenly." Another report, made by the Public Safety Commission, found no evidence that the accident was caused by anything but excessive speed.

It transpired in evidence that the driver, who was killed and had been accompanied on the footplate by a road foreman of engines (the equivalent of a locomotive inspector in this country), although he had reduced from 74 m.p.h., had released the brakes and was actually rounding the curve at 59 m.p.h. The inspector, the sole survivor on the footplate, stated in evidence that, observing this, he instructed the driver to make a further brake application, but the driver, instead of doing so, apparently became momentarily confused, and closed the throttle. This, he alleged, resulted in sudden retardation of the locomotive, whereupon a sort of collision occurred between it and the heavy train behind, the momentum of which had not been simultaneously checked as it should have been by a judicious application of

some slight discomfort to the passengers. It would therefore seem, with so wide a margin below overturning speed as to allow a slight decrease for the vertical curve, that excessive speed alone would not have caused the accident, but that the critical factor was the jack-knife action between the engine and the tender, propelled forward by the heavy train, when some action was taken on the footplate to cause a sudden retardation of the engine.

Both locomotive and track, according to the evidence, were in first class condition. The rails were of 127-lb. section, 39 ft. in length, laid on an average of 24 treated oak sleepers to the rail length, and supported thereon by double-shoulder canted soleplates, spiked with two rail spikes and two lag spikes a plate; eight rail anchors and five gauge ties a rail length were provided; the 6-hole fishplates were 36 in. in length. The ballast, consisting of 20 in. of crushed rock, was ample. Variations in curvature and cant were negligible; and it is a tribute to the correctness of the cant for the prevailing speed on this curve, and the care with which that speed was normally observed, that the wear on both high and low rails was practically uniform. Express and freight trains are segregated on separate tracks, as indicated on the diagram. All express locomotives are fitted with self-recording speed

indicators which are checked for accuracy by an electric timing device, and only in rare instances are they more than 2 m.p.h. out. Moreover, a check of the speed recorder tapes of engines which had hauled this particular train during the month before the accident, disclosed that the maximum speed on the curve was 48 m.p.h. and the minimum 39 m.p.h., which speaks well for all concerned in the observance of the restriction, and the advantage of automatic speed recorders.

Although the conditions invited telescoping, it is noteworthy that the all-steel cars showed no signs of this type of damage, despite the fact that the force of the stoppage when the engine overturned and collided with the rock wall was such as to cause serious damage to all but the second of the first ten vehicles, and altogether 31 persons lost their lives, and 51 others were injured.

As we recorded in our previous report of the accident, the second vehicle, a baggage car, became uncoupled at both ends and stopped, upright, with only the front bogie derailed, on the proper line 285 ft. ahead of where the engine came to rest. This was perhaps the most remarkable feature of the whole derailment, considering that the rails had been burst by the locomotive and that succeeding vehicles followed the locomotive and not the second vehicle. The latter feature can be explained only on the assumption that the third vehicle had derailed through surge, and the couplers had come out of clutch.

Another odd feature was the behaviour of the fifth coach. This also pursued the line of the track despite the fact that the rails had been burst. But in this case the entire roof is stated to have been removed, and the right-hand side heavily damaged. The only logical explanation is that the fifth coach followed the fourth coach on to its side, struck the rear of the third car with its roof, and was jerked back on to its wheels. This would explain the positions of the sixth, seventh and subsequent cars. Though many couplers were pulled from their sockets (which can have been done only by heavy jerks) others were merely bent. For breakaways to occur when the couplers remain in place the probability is that certain vehicles overturned at the curve, thus lifting the coupler knuckle out of contact with the following vehicle. This must have occurred between the first and second vehicles of the train to allow the second vehicle to pursue its way round the curve.

One more feature in an accident of many remarkable characteristics may be mentioned. As our previous report indicated, the stout bar frames of the locomotive were doubled over in front of the firebox in the form of a hairpin, thus bringing the rear end in close proximity to the forward buffer beam, the trailing bogie having previously broken away. At first sight it might appear as if this had been done by the explosion of the boiler, which occurred when a pinnacle of rock pierced the crown sheet; but two facts militate against this argument. The first is that the rush of steam, though great, would be unlikely to blow the main frames themselves off the boiler connections, though it would undoubtedly have blown off the ashpan. Secondly, for the main frames to double back in this way, once the engine was on its side, would have been almost impossible, as the first car of the train was lying upside down in contact with the engine wheels. The doubling-back therefore appears to

have been caused during the progress of the engine after it left the rails; and a mental reconstruction of the actual derailing would indicate that the rear of the tender, being lifted and forced outwards, swung the rear of the engine after it, and the act of capsizing may have twisted the dragbox half off the frames, while the boiler part of the engine swinging round completed the separation. It would be quite likely that the whole engine, having capsized, made a complete revolution on its side before striking the rock and coming to a halt, by no means an impossible process considering the momentum and the direction of the engine when the derailment occurred. The objection to this theory is the comparatively short distance (400 ft.) which the engine travelled before coming to rest. Nevertheless, considering that the tender ended its career in advance of the engine cab, this appears to be the most likely theory. As a final peculiarity, the trailing bogie of the locomotive had not been found up to the time of the inquiry.

An important factor in the accident may well have been the influence of the locomotive inspector on the driver. The former gave the latter an order to reduce speed, and from what is said in the report, it seems probable that this caused the driver's attention to be momentarily divided between his own judgment and respect for his superior's order. This may well have thrown him into a state of confusion, leading him to do the very thing that caused the derailment. According to the testimony of the locomotive inspector—which, of course, could not be confirmed since he alone of those on the footplate survived—the driver closed the regulator instead of applying the brake. But the sudden closing of the regulator does not normally result in a sudden retardation of the engine, and it seems possible that the driver may, in fact, have applied the brake, perhaps to the engine only; though even if to the whole train it would take effect at the front first and so tend to cause a surge forward against the tender, in which the water itself would be thrown to the front, disturbing the centre of gravity. Whatever action was taken may have been against the better judgment of the driver, whose own decision might well have been that the best thing at that critical moment, when he was already about half-way round the curve, was to continue, even though he was travelling at a speed 14 m.p.h. in excess of the stipulated limit.

This raises the important matter of fixing and leaving responsibility on the person to whom authority is delegated. To the driver is delegated the task of controlling the locomotive; and the proper function of a locomotive inspector who may be travelling upon the footplate is to inspect and observe, making his comments at an appropriate time afterwards, but doing nothing to interfere with the driver's judgment at the time. After all, an engine driver is not given charge of an important express until he is fully experienced and well capable of bearing the responsibility entailed by the task. Great though the temptation may be to interfere in a crisis, it should be resisted, and the driver, when exercising so important a function, left strictly alone to use his own judgment. It is a matter of fundamental principle which cannot with impunity be violated in any system of organisation, that where authority is delegated, there responsibility must lie, and any short-circuiting is apt to cause at least trouble and inefficiency, if not even danger.

The Sixth Avenue "L" New York

The opening towards the end of last year of the Sixth Avenue subway in New York went far towards replacing the facilities formerly afforded by the famous Sixth Avenue elevated railway. The latter was built by the Metropolitan Elevated Railway Company (formed on June 17, 1872), was opened June 5, 1878, and was leased from February 1, 1879, to the Manhattan Railway Company which subsequently acquired complete ownership. In common with other Manhattan properties it passed under lease to the Interborough Rapid Transit Company on April 1, 1903, shortly after it had been converted from steam to electric traction. For many years the demolition of this Sixth Avenue elevated line has been the goal of numerous Manhattan civic groups on the

grounds that it destroyed the amenities of the neighbourhood. Eventually in May, 1938, it was reported that the demolition of the line might soon take place as the result of an agreement between the Manhattan Railway Company (which retained the ownership) and the city authorities; the latter were in a strong position to negotiate as the company was seriously in arrears with its tax payments. Eventually the Sixth Avenue elevated line was sold at foreclosure on October 13, 1939, was closed on December 4 of the same year, and subsequently dismantled. The remaining Manhattan Railway properties passed into the hands of the City of New York Board of Transportation on June 12, 1940, as explained at p. 87 of THE RAILWAY GAZETTE for July 26, 1940.

ELECTRIC TRACTION SECTION

The Waterloo & City Rolling Stock

A description of the mechanical portions of the 600-volt d.c. tube trains put into traffic last year

THE 28 vehicles built for the rehabilitation of the Southern Railway's Waterloo & City tube line, reopened in its new form on October 28, 1940, and described in THE RAILWAY GAZETTE for November 15 of that year, comprise 12 motor-coaches and 16 trailers of steel construction. The electrical equipment for these cars was described fully in the Electric Traction Section for November 15 last, and the present article deals with the general and mechanical portion design, which was the responsibility of Mr. O. V. S. Bulleid, the Chief Mechanical Engineer of the Southern Railway. The trains themselves were built throughout at the works of the English Electric Co. Ltd., the electrical equipment—built to the requirements of Mr. A. Raworth, the railway company's Chief Electrical Engineer—coming from the same maker's works.

Train Formation and Limitations

During rush hours the trains are made up into five-car sets comprising two motor-coaches and three trailers taring about 115 tons, the motor-coaches weighing about 29½ tons and the trailers 18½ tons. Such a train is driven by four motors with an aggregate one-hour rating of 760 h.p. In non-rush hours the service is maintained by five motor-coaches running singly. A motor-coach has a capacity for 40 seated and 60 standing passengers, and a trailer 52 seated and 80 standing. The total carrying capacity of a rush-hour train is thus about 600 passengers. The top speed allowed on the line is just over 30 m.p.h.

Naturally, more than a little difficulty was experienced in designing relatively powerful stock of modern characteristics to go through the restricted loading gauge—12 ft. 1½ in. dia. tubes—and round curves of 5 chains radius over which the tube dia. is 12 ft. 9 in. The restrictions were felt particularly in the motor and trailing bogies and in the portion of the underframe above the driving bogie, which frame also supports the high-tension control gear. Once again in railway practice, welding provided the solution, and enabled the bogies, underframe and body framing to be built up neatly and to a rigid construction without the weight exceeding the moderate values recorded above. The underframes are welded throughout, as are the framings of the motor-coach and trailer bodies, but the body panel plates are attached to the framing by a

combination of arc welding and riveting, and the bogies are made up of welded assemblies riveted together. Cresta electrodes were used for all welding.

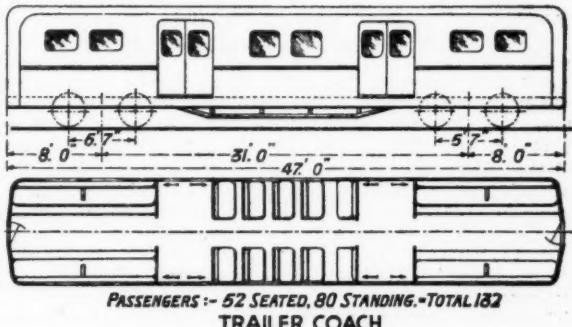
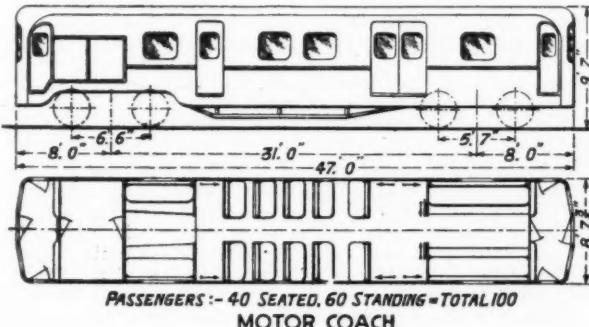
Underframes

Both motor-coach and trailer underframes comprise four main longitudinals of channel section, but whereas those on the trailer are horizontal and parallel from end to end, those of the motor-coach have had to be raised at one end to clear the traction motors, and the inner longitudinals are splayed outwards for the same reason. It is the raised portion which carries the h.t. electrical equipment, and a very rigid platform has been constructed and well reinforced by gussets at the point where the underframe drops towards the centre of the car. Another feature which will be noticed from the underframe drawing is the extremely stiff bracing of the ends to take up all the buffing and drag stresses and distribute them over the underframe as a whole. Below the motor-coach underframe are slung several items of equipment, including the main resistances and the air compressor. Wedglock automatic centre couplers have been used throughout on both ends of each of the cars, and are equipped with Spencer Moulton's rubber springs. The couplers were manufactured by Hadfields Limited.

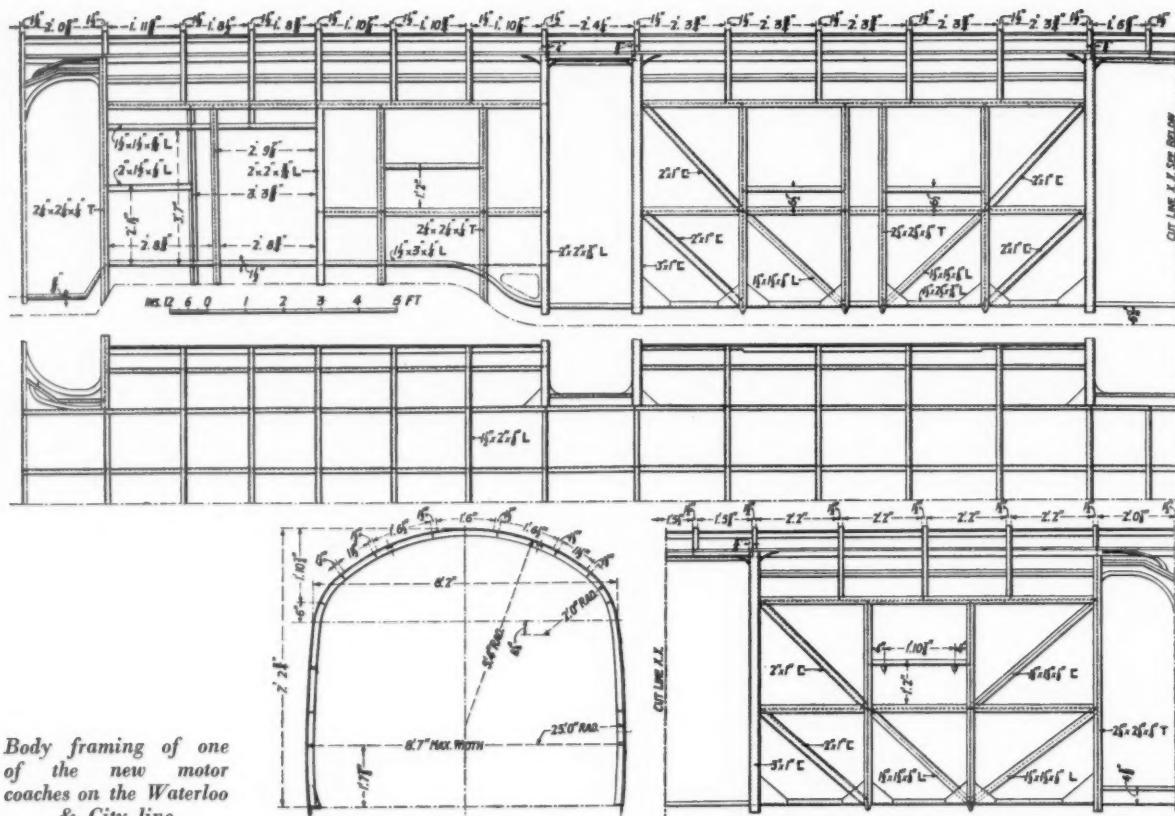
Bodies

The body framing details of the motor-coaches are shown in one of the accompanying drawings. The framing is 8 ft. 7 in. wide over the outer steel panel plates at the widest part, and the sides are curved to a radius of 25 ft. and merged into the 5 ft. 4 in. radius of the roof. The restricted loading gauge has necessitated the doors being carried up into the roof curve, and unfortunately this breaks into the roof longitudinals at the cantral level and just above. Hence the door pillars and their attachments to the roof frame members are exceptionally rigid.

In general, the design of the body framing is on the principle that each member takes an equal share in the load distribution and without anything which might be termed a main member, but one feature which should be noted is the ample diagonal bracing of the sides. This type of uniform-load structure has been developed by English Electric for all types of passenger



Motor-coach and trailer diagrams of the new stock



Body framing of one of the new motor coaches on the Waterloo & City line

rolling stock. The exterior of the side panel plates is covered with Monastral metallic green Rexine except for the roof and ends, which are painted aluminium. The lettering is gold for the word "Southern," and numbering is gold and black. The inside surface of the panel plates is sprayed with Roberts's asbestos to prevent drumming. On the body sides of the motor-coach equipment compartment are inspection doors for the electric switchgear. Two of these are of the hinged type, and one of them incorporates a run-way so that certain assemblies can be dropped and withdrawn through the side openings.

All the side doors in the passenger saloons are of the sliding type, made of Alpax, and pneumatically-operated under electrical control by the guard; the air motors are of G. D. Peters's type. One single and one double passenger door are provided on each motor-coach side, and two double doors on each trailer coach side, thus giving ample opening for the rapid loading and unloading of passengers. There is a door control position in each driving cab, and the guard is in the cab at the rear end of the train. The car end doors are also of Alpax, but the hinged doors in the driving compartments are of another aluminium-silicon alloy, and were cast at the English Electric Stafford works. Only the driving compartment doors have drop lights, and these were furnished by Young's Limited. Above each window in the passenger saloons are hinged glass ventilators of Beckett, Laycock & Watkinson manufacture. As with the doors, the windows and the sliding door lights have had to be carried into the roof radius, and curved Triplex glass is inserted in the frames. The interiors of the cars are finished in dual-coloured Rexine with light polished mahogany mouldings, and every effort has been made to provide a light interior, in contradistinction to the "Black Maria" appearance of the original Waterloo and City cars.

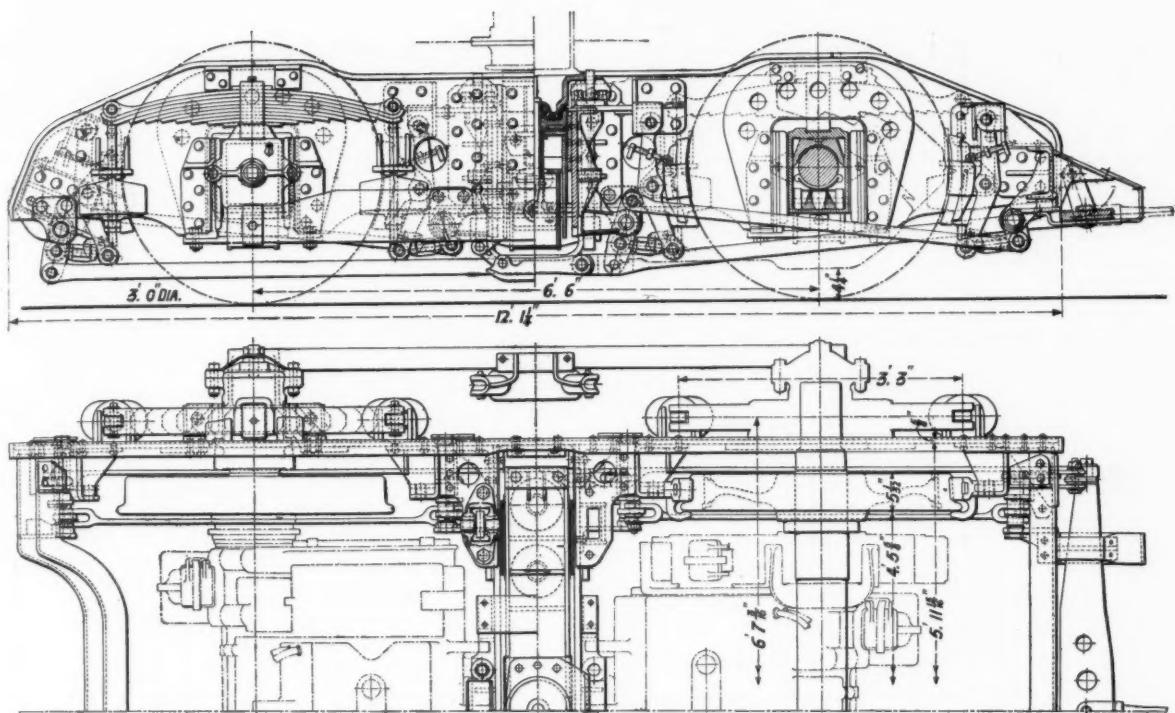
There are both transverse and longitudinal seats; the frames of the latter are formed by the wheel arches. The transverse seats were made throughout at the coach works, and are built up on tubular steel frames stove-enamelled, and both types

have spring-filled cushions and squabs of horse hair and wadding covered with rust-coloured uncut moquette. From the longitudinal seat frames, tubular grab rails, finished in Bluemel's Firmoid, rise to the roof, and those at the entrance and exit vestibules are stayed to the doorway partitions. The floor is formed of galvanised dovetailed steel sheeting filled with maple laths, overlaid with Insulwood and finally covered with linoleum. All the timber in the cars is treated with fireproof paint.

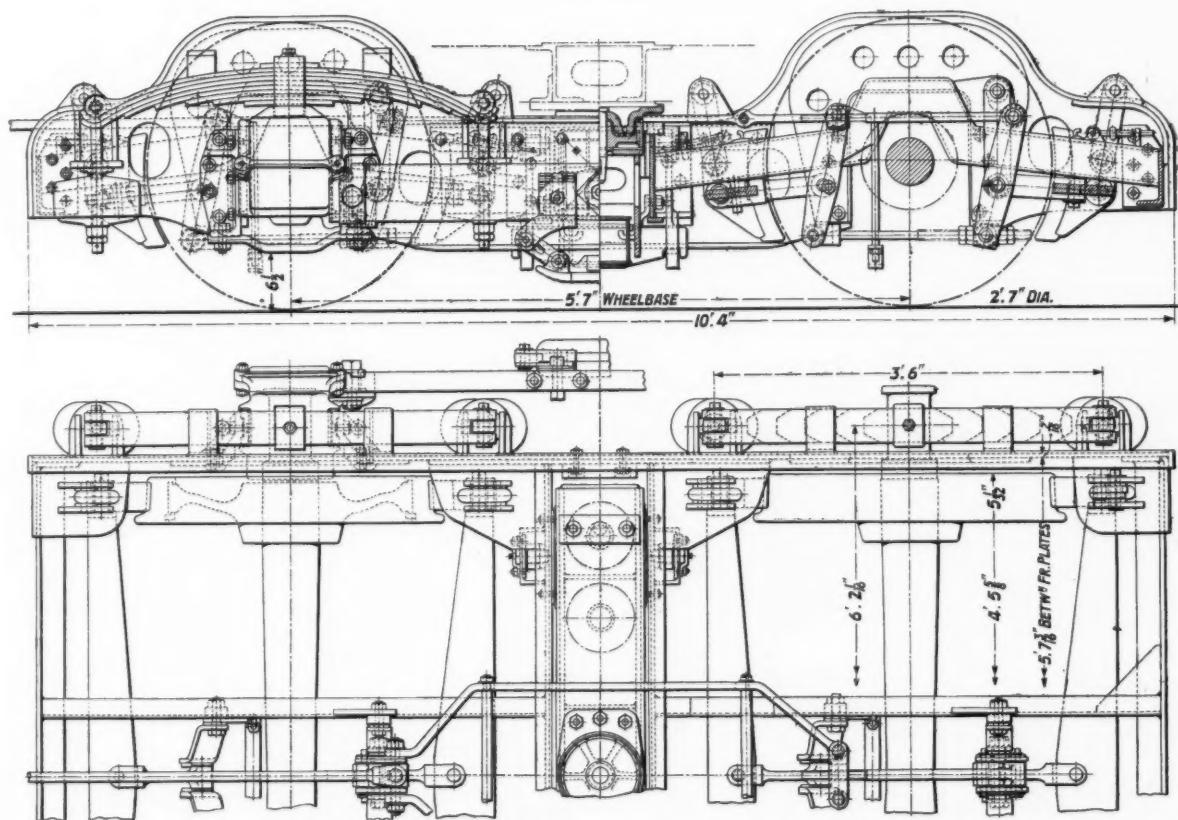
Bogies

The design of the bogies presented the problems common to stock intended for operation on urban underground railways; the principal problem is the insertion of powerful traction motors into a frame structure which is rigid enough to withstand high accelerative and decelerative forces, and which is strictly limited in three dimensions yet must carry also the rigging to apply the heavy braking efforts. The 6 ft. 6 in. wheelbase of the driving bogie is the maximum which could be used in view of the 5-chain curve near the Waterloo end of the line, and this curve also is the limiting factor in the pitch of the bogie centres and thus in the length of the cars. A difference compared with much subway stock built within recent years is that plain bearings are used in the axleboxes.

A combination of welding and riveting has been adopted for the frame structures of both driving and carrying bogies. Each side frame comprises a vertical plate with a flange piece welded to the top and bottom, and various supports such as the spring hanger brackets are welded on also. After welding the frames were normalised by heat treatment. Large horn-shaped strengthening pieces were welded and riveted on the inside round the axlebox guide slots, and the guides themselves are of the separate pattern secured by rivets running through the guide, frame plate, and strengthening piece. To the frame plate assemblies are riveted welded sub-assemblies comprising the centre transoms and the headstocks together with details such as motor-nose suspension brackets and brake hanger and cross beam brackets. Between the transoms is the welded steel bolster supported by two nests of double

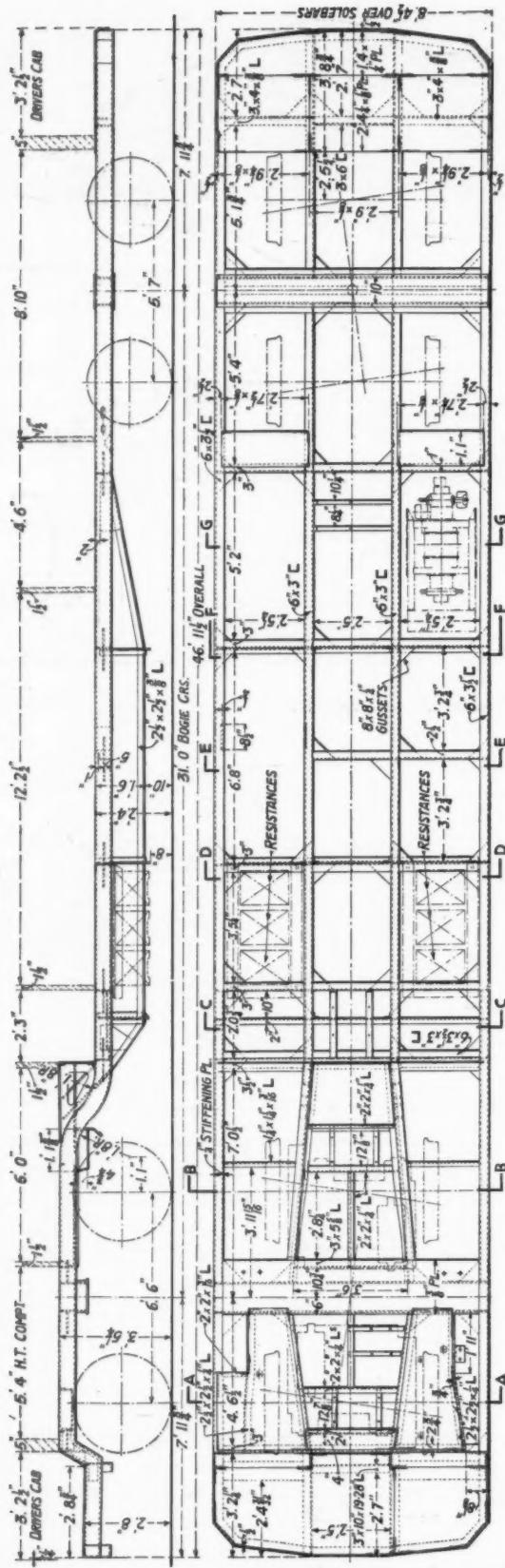


Standard-gauge motor bogie of the Waterloo & City tube trains

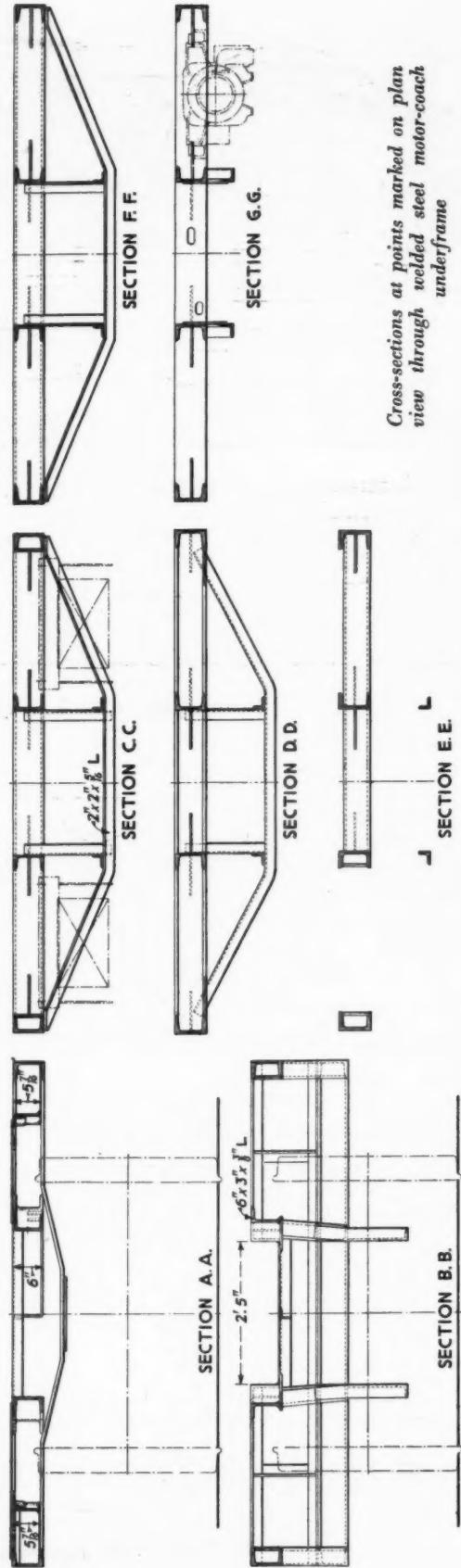


Trailer bogie supporting one end of the motor-coach

April 4, 1941

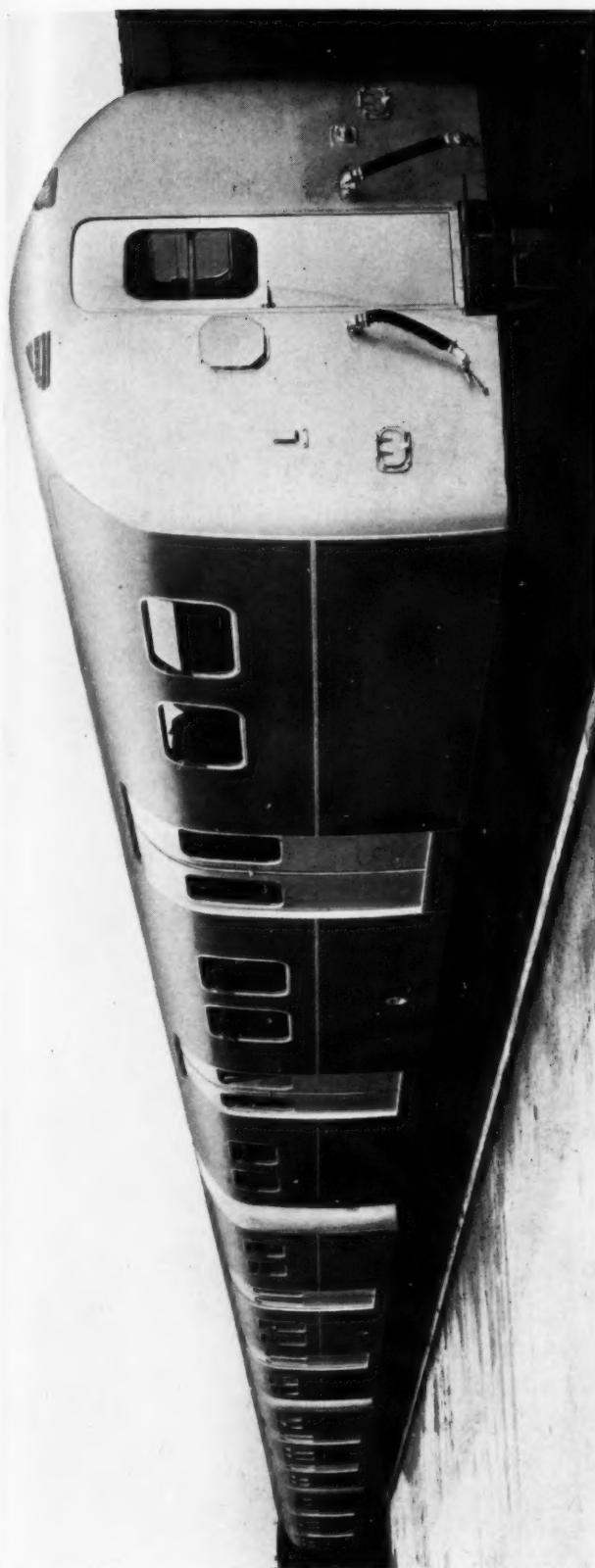


General arrangement of 47-ft. all-welded steel underframe for motor-coach

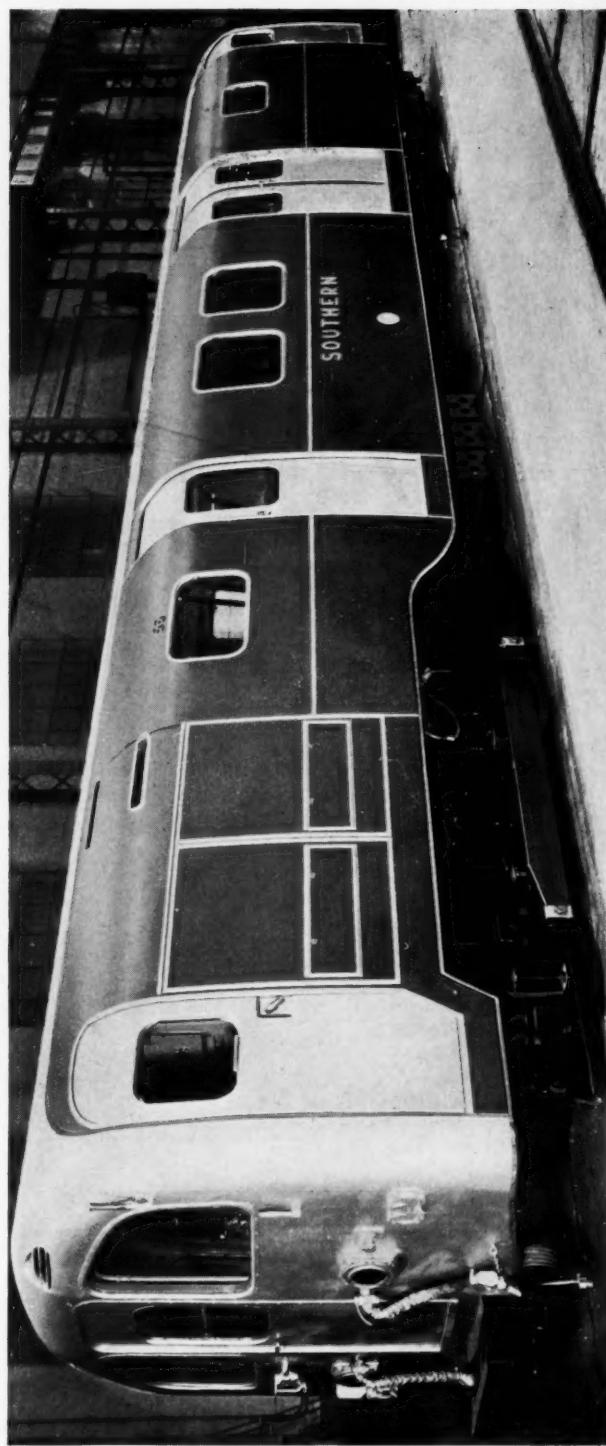


Cross-sections at points marked on plan view through welded steel motor-coach underframe

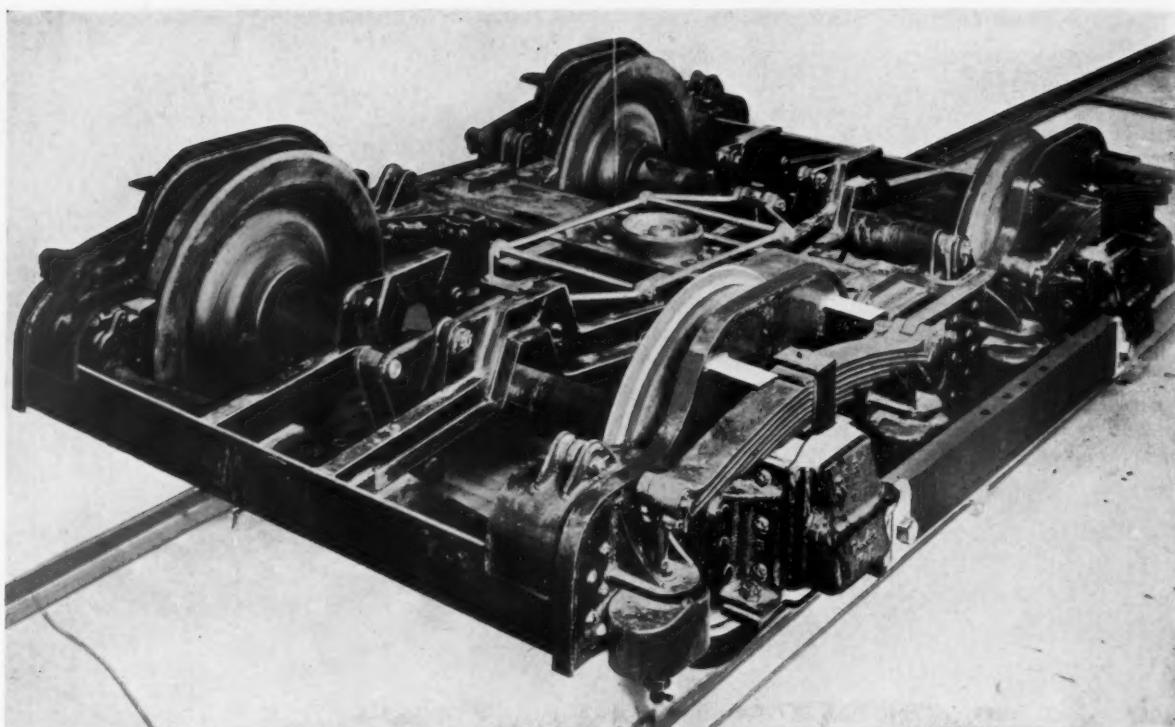
NEW ALL-STEEL WATERLOO & CITY RAILWAY TUBE STOCK



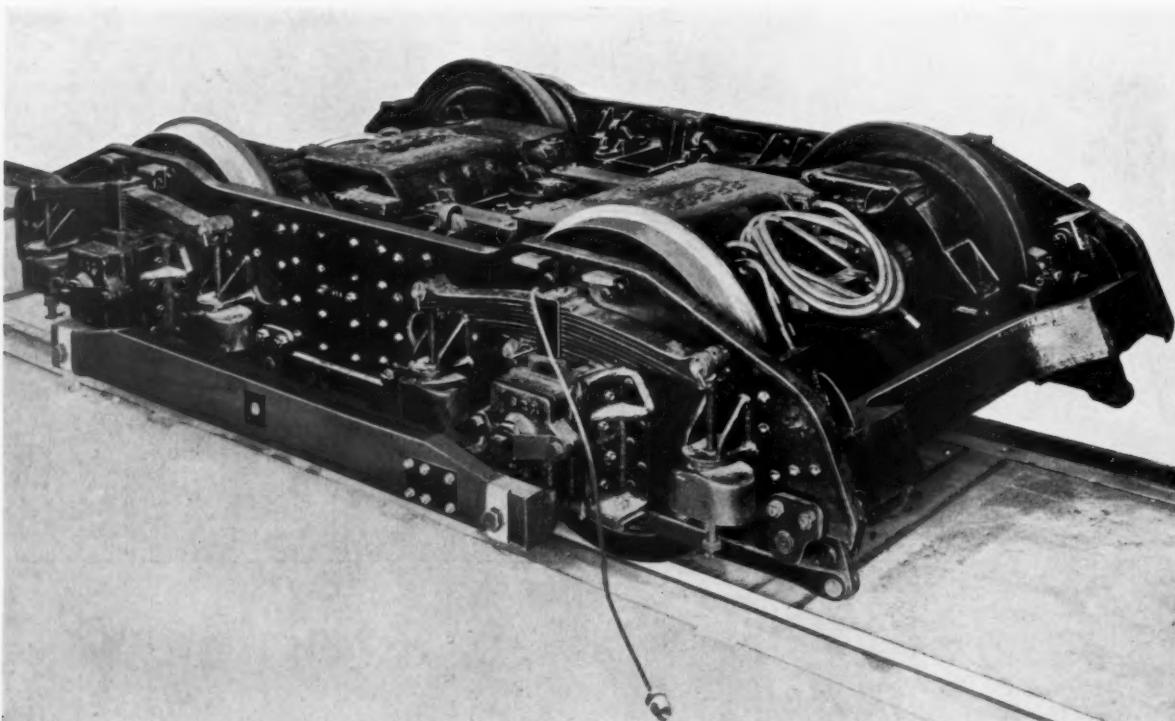
Above: Train of four coaches for the Waterloo & City tube line of the Southern Railway described in an article on preceding pages



Right: 380 h.p. two-motor double-bogie motor-coach of all-welded steel construction



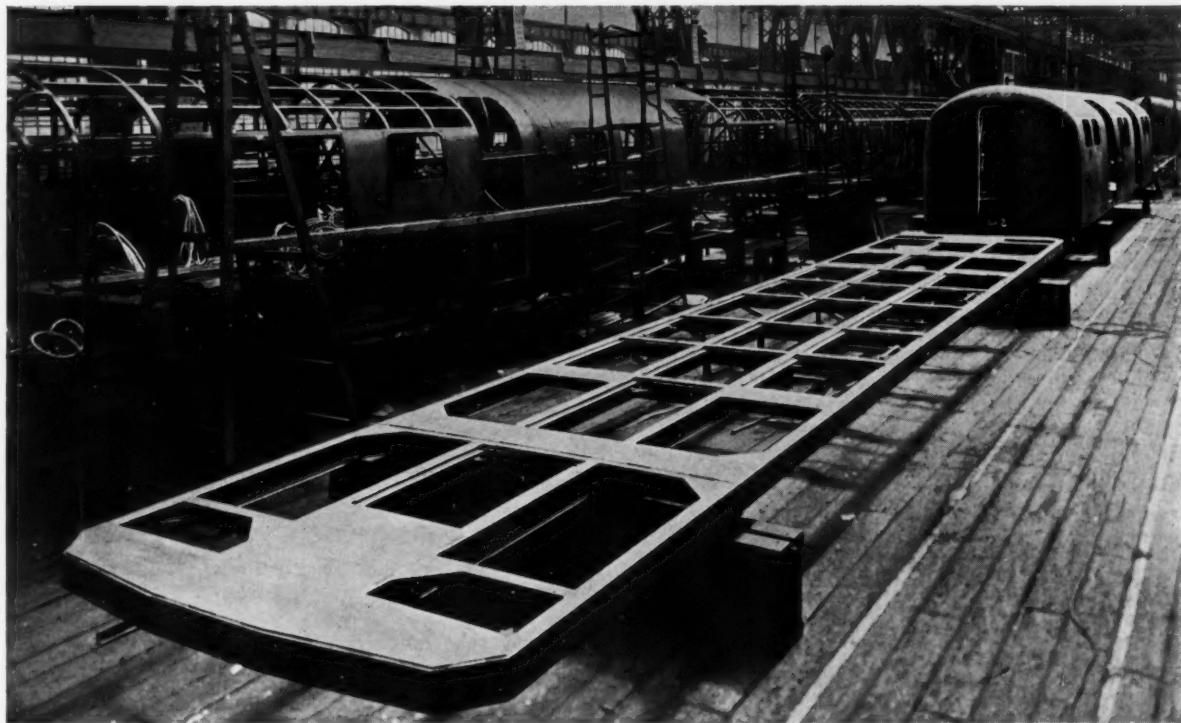
General view of welded trailing truck showing longitudinal frame stays cranked to clear axles, and the tubular brake pull rods surrounding the bogie centre pivot, Waterloo & City tube stock. Slight modifications have since been made to the brake gear



General view of driving bogie with two motors. Like the trailing bogie it has laminated springs having a reverse camber under normal load and with spring hangers cushioned by rubber springs

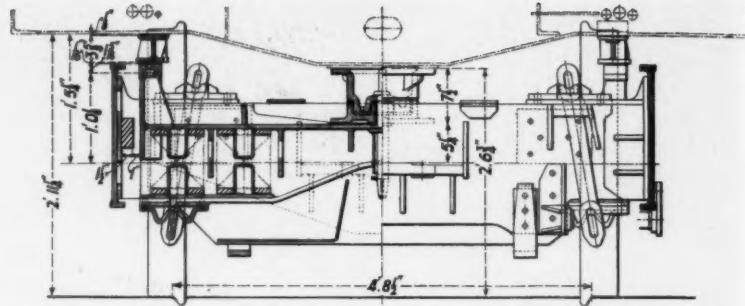


The light and airy interior of the new stock on the Waterloo & City tube railway belonging to the Southern Railway



Trailer car underframe and coaches under construction at the works of the English Electric Co. Ltd.

Cross section through motor bogie beneath the equipment end of the motor-coaches on the new Waterloo & City tube stock, Southern Railway



helical Timmis springs at each side. The body weight is taken through the plain centre pivot, which is fitted with a loose phosphor-bronze liner. The side rubbing blocks are fitted with Ferobestos pads. Because of the space occupied by the traction motors, the driving bogie frame structure includes no longitudinals apart from the frameplates, but in the trailing bogies the transoms and the headstocks are connected by channel-shaped members built up by welding and secured at the ends by the same means; they are cranked upwards to clear the axles.

Springs and Wheels

In addition to the swing bolster, the suspension system comprises overhung laminated bearing springs with Spencer Moulton rubber auxiliaries bearing against the hanger brackets. The laminated springs themselves are reminiscent of those devised a year or two ago by Jonas Woodhead & Sons Ltd. for the then new trains of the L.P.T.B., and have a reverse camber under normal static load, two plates bent part of the way round the back-plate eye, and a short packing plate under the top of the buckle; these springs were made by Ibbotson Bros. & Co. Ltd. The motor-bogie springs have 10 plates, of which three are full length, and the trailer bogie springs have eight plates, of which three are full length.

Tyred steel disc wheels are used, 36 in. dia. on tread in the motor bogies and 31 in. in the trailers. The motored axles have journals 9 in. by $5\frac{1}{2}$ in., and the trailers $7\frac{1}{8}$ in. by $4\frac{1}{2}$ in. journals. Both run in cast steel boxes, which in the motor trucks also carry the wooden beams for the current collecting shoes. In the trailing trucks of the motor-coaches the beams are secured to the axlebox guides, and a slightly different form of shoe suspension is used to give the requisite rise and fall over inequalities in the conductor rail level.

Brakes

Westinghouse air brakes are incorporated, and there is one cylinder for the two bogies on each coach; they are fitted with slack adjusters and are located on the car underframes; and despite the sharp curves the primary pull rod works on the first brake cross beam of the motor bogie through a double eye connection. Air is furnished by rotary compressors supplied by the B. A. Holland Engineering Co. Ltd., and one of these motor-driven sets is slung beneath the underframe of each motor-coach.

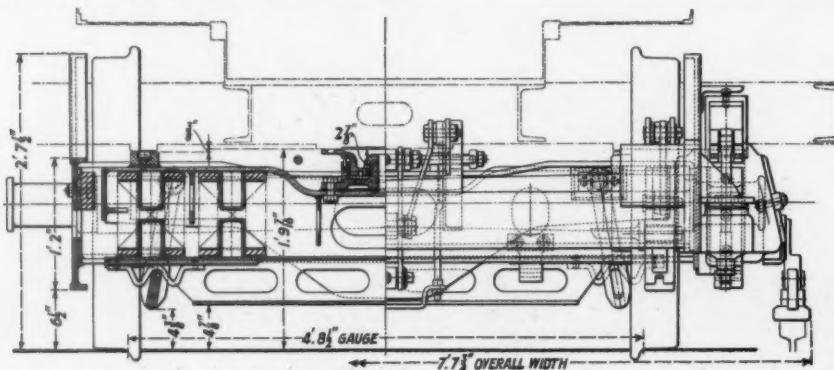
When a motor-coach forms part of a train, the brake air pipes are coupled up at one end. Electro-pneumatic switches

are provided at each end of a motor-coach to break circuit when there is pressure in the hose coupling pipes, and make contact when there is no pressure. When the motor-coach is disconnected from a train ready to run singly, the electro-pneumatic switches therefore make contact and connect all the lights on the coach to the same supply.

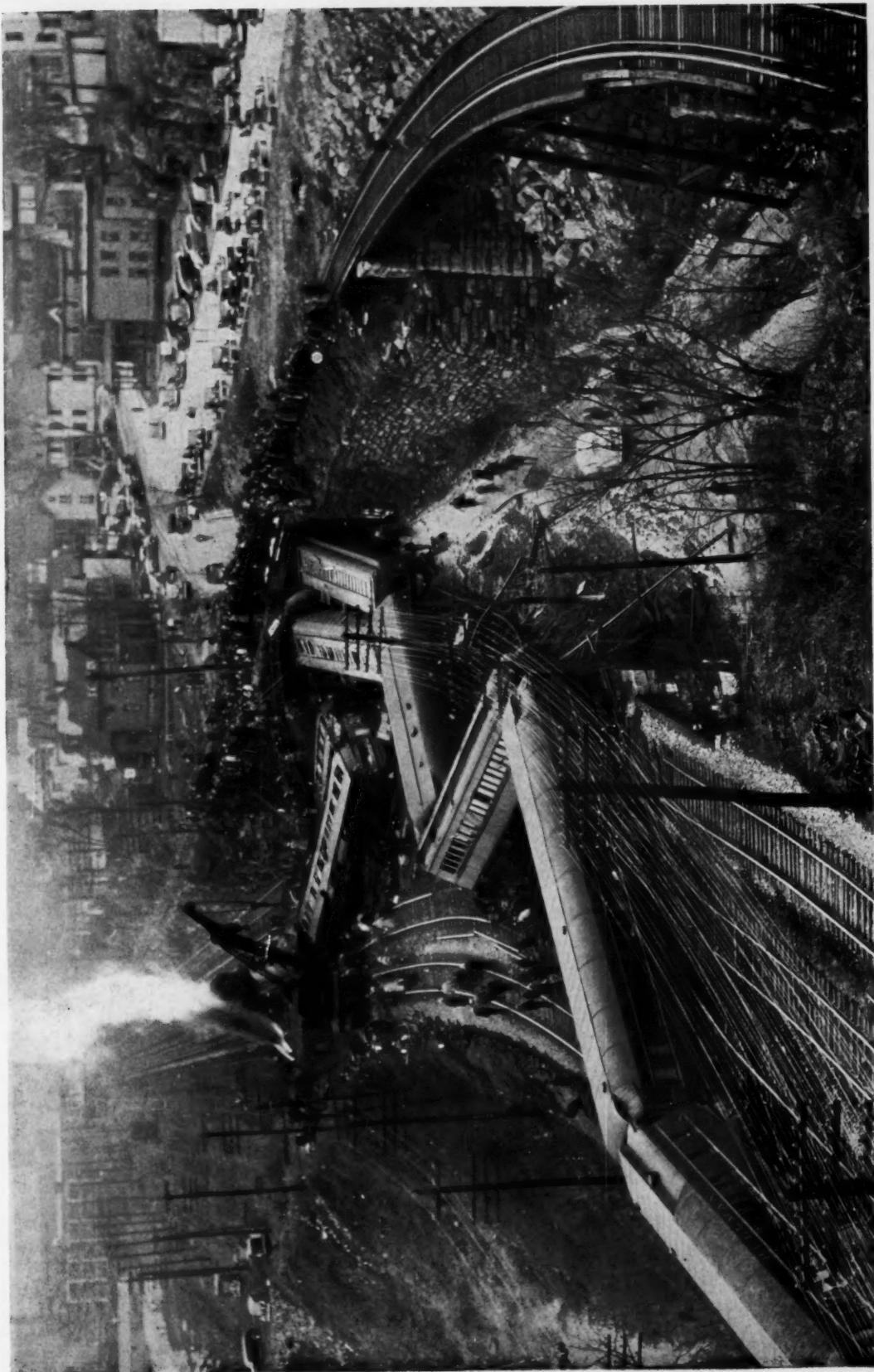
The passenger saloon lighting is supplied at line voltage, there being a number of lamp bulbs in series on each lighting circuit. Half the lights on each coach of a train are fed from the motor-coach at each end. There is a lighting switch on each motor-coach which controls the lights fed from that car, but there are no lighting switches on the trailers; each trailer carries a pair of lighting fuses, one of which protects the circuits fed from each motor-coach. On the motor-coaches the lighting jumpers are interlocked with lighting switches so that the jumpers cannot be withdrawn from the receptacles with current flowing. Each motor-coach is equipped with a 12-volt Nife battery, supplied by Pritchett & Gold and E.P.S. Limited, for emergency lighting in case of a failure of the main supply. In the driving cabs there are a combined control and overload reset switch, a master controller, and a Loudaphone to give telephonic communication between the driver and the guard.

Electrical Equipment

For the sake of completeness, the principal features of the electrical equipment, fully described in our issue of November 15 last, may be referred to again. To meet Ministry of Transport requirements for tube railways, no power bus line is provided down the trains, and each motor-coach collects its own power current; to avoid trouble when passing over gaps in the conductor rail a no-volt relay is fitted to each motor-coach. There are two axle-hung traction motors with sleeve suspension bearings and roller armature bearings mounted on one truck of each motor-coach; the individual one-hour rating is 190 h.p. at 600 volts. The control is of the multiple-unit type with electro-pneumatic unit switches, and operation is of the normal series-parallel type with bridge transition. An extra step of resistance is introduced in order to limit the initial acceleration of a motor-coach when working singly. The six resistance and five circuit setting contactors and the two line switches are identical with those used on the Southern Railway surface line electric rolling stock, the main resistances and motor-driven compressor are mounted on the underframe; otherwise all the electrical gear is housed in the equipment room.



Cross section through four-wheel carrying bogie of a motor-coach; collector shoes are carried on this bogie as well as on the motor bogie



*Wreck of the Lake Shore Limited, New York Central System, after derailment on 14½-ch. curve at Little Falls on April 19, 1940
(See article on page 387)*

Railways and the War—64



Rendsburg bridge showing (left) main suspension and cantilever girders, and (right) transporter bridge suspended below double-track railway main span



Hochdonn bridge showing (left) deep lattice girder bay, and (right) widely straddled legs with their universal joints



Left; Grünthal bridge, with inward-leaning segmental arch girders carrying single line and roadway decking

**Kiel
Canal
Bridges**

(See page 403)

RAILWAY NEWS SECTION

PERSONAL

The Rt. Hon. L. S. Amery, Secretary of State for India, who broadcast to Yugoslavia on March 26 in Serbian, can speak French, German, Italian, Turkish, Serbian, a little modern Greek, and Bulgarian, and he also has a knowledge of Persian. Mr. Amery was a Director of the Southern Railway Company from December, 1931, to May, 1940. He was Secretary of State for the Colonies from November, 1924, to June, 1929, and also Secretary of State for Dominion Affairs from July, 1925, to June, 1929.

We regret to record the death, on April 1, of Lord Rockley. His retirement from the board of directors of the Southern Railway Company, recorded in the annual report, severed a connection with the company and its predecessors which began almost at the beginning of the present century. Lord Rockley, then Sir Evelyn Cecil, joined the board of the L.S.W.R. in 1902, and upon grouping continued as a Director of the Southern Railway Company, from which he retired in December, 1940. He was also Director of the Somerset & Dorset and the West London Extension Railways, and a Southern Railway representative on the Great Western & Southern Joint Committee. He was a member of the Executive Committee of the International Railway Congress Association and was a delegate at the congresses at Washington in 1905, at Berne in 1910, at Rome in 1922, at London in 1925, at Madrid in 1930, at Cairo in 1933, and at Paris in 1937.

Mr. John Montague Eddy, C.B.E., who, as recorded in our December 13 issue, has been appointed Chairman of the Buenos Ayres Great Southern and Buenos Ayres Western Railways, has now been appointed to the London board of the Royal Insurance Company.

On Thursday, March 27, General Dushan Simovitch, Prime Minister of Yugoslavia, formed a new Cabinet, after the overthrow of the Government which was responsible for the signing of the Tripartite Pact. M. Yefitch is Minister of Transport; M. Andres, Minister of Trade & Commerce; M. Koulovetz, Minister of Public Works; and M. Ivan Torrar, Minister of Posts, Telegraphs & Telephones.

We regret to record the death, on March 21, of Sir Richard Durning Holt at the age of 72. Sir Richard was Chairman of the Mersey Docks & Harbour Board, and head of Alfred Holt & Company.

Mr. R. G. Forbes, who, as recorded in our March 14, issue, has been appointed Assistant General Manager (Commercial) South African Railways, Harbours, & Airways. He joined the Natal Government Railways in 1900 after five years of service with one of the Scottish railways. After a period as relief stationmaster he joined the Imperial Military Railways at Johannesburg in 1901, and served in various capacities. He became Trains Inspector, Johannesburg, in 1908. Two years later was promoted to be District Inspector, and was transferred to Kimberley in 1913 in the same capacity. During the Natal Rebellion of 1906, Mr. Forbes served throughout as machine gun officer of the Transvaal Mounted Rifles. In the 1914-1919 war, he served with the South African Engineer Corps in South West Africa, and at the conclusion of hostilities in that territory, was in charge of the Southern Section of the railways and Luderitz Harbour; later he moved, as Port & Operating Superintendent, to Walvis Bay. In 1922, Mr. Forbes went to Durban as Assistant Superintendent (Operating). After four

years in that post, he served, with similar rank, on relieving and special duties, and as member of the Staff Committee and Chairman of the Appeals Board until 1929, when he was promoted to Port Goods Superintendent at Durban. The following year he became Superintendent (Operating) at Durban. Spells of relief duty as System Manager and Chief Traffic Manager preceded his appointment as Superintendent (Operating) at Headquarters. Shortly afterwards Mr. Forbes went to Kimberley as System Manager, and in February, 1936, was transferred to Pretoria and, in 1937, to Johannesburg in the same capacity. In September, 1938, he was appointed Assistant Chief Traffic Manager. It was in July last that Mr. Forbes was seconded to the Department of Defence as Deputy Quartermaster-General at Defence Headquarters, where he is still serving, with the rank of Colonel, attached to the Staff Corps. During his harbour service, Mr. Forbes became a member of the Royal Naval Volunteer Reserve and attained the rank of Lieutenant-Commander, having secured first-class certificates in navigation and seamanship. He served with the minesweepers and for some years was Commanding Officer of the section. He holds the Volunteer Decoration and is an Assistant Commissioner of the St. John Ambulance Brigade, S.A.R. & H. District, in which Order he was invested with the Insignia of Serving Brother. Mr. Forbes has been a member of the Volunteer & Active Citizen Force since its formation and in his younger days was one of South Africa's best-known rifle and revolver shots. He was twice

sent overseas to Bisley, on the last occasion as Captain of the Transvaal Provincial Team.

Mr. F. S. Whalley, Managing Director of the Vulcan Foundry Limited, and Major E. C. Straker, Chairman of Robert Stephenson & Hawthorns Limited, have joined the board of the North British Locomotive Co. Ltd.

We regret to record the death on March 14 of Mr. Alexander Smith Lorimer, a Director of the North British Locomotive Co. Ltd. since 1911. Mr. Lorimer, who was 63 years of age, was the second son of the late Sir William Lorimer, the first Chairman of the company.

Mr. Charles R. Hudson, who was a Vice-President of the National Railways of Mexico from 1909 to 1917, died in California on January 17. For some time Mr. Hudson was also a Vice-President of the Cuba Railroad.

Herr Otto Liebi, Operating Superintendent of the 2nd Division of the Swiss Federal Railways retired under the age limit on December 31. He was born at Zollikofen in 1875, entered railway service in 1894, and eventually became Stationmaster at Lyss. He became an Inspector in the head offices at Berne in 1916 and was appointed to the position he has just relinquished in 1933. In 1939 he received the additional title of Deputy Divisional Assistant. He has been succeeded by Herr Emilio Meister, his assistant, who joined the railway service in 1904. Dr. E. Lehmann, Inspector at Basle, has become assistant to Herr Meister.

The death has taken place in Toronto on February 5 of Mr. John Riordan, Special Agent for the Express Department of the Canadian National Railways. Mr. Riordan had been on the staff of the C.N.R. for 24 years and was a veteran of three wars. He cooperated with the Toronto police in the solution of the sensational mail-car robbery at Union station in Toronto in 1928, and with the provincial police in connection with the Labatt kidnapping case. As a tribute to his effective work as an investigator, he has held, since 1919, a certificate as supernumerary officer of the Royal Canadian Mounted Police. Mr. Riordan was born in Tralee, Ireland, on August 12, 1880. He went to the United States and served with the U.S. Marines in the Spanish-American War. He was a veteran of the South African War and also served in the 1914-1919 War with the rank of Sergeant; he was retained in

April 4, 1941

Canada on special secret service duties. Mr. Riordan belonged to the South African War Veteran's Association and the Canadian National Railways War Veterans' Association.

Mr. T. H. Watermeyer, M.Inst.C.E., M.Inst.T., who, as announced in our December 7 issue, retired from the general management of the South African Railways & Harbours in February, was born at Graaff Reinet, South Africa, in 1879. He was educated in England and began his railway career with the Cape Government Railways in 1902 as a temporary Assistant Engineer on the Port Elizabeth-Avontuur narrow-gauge construction work in South Africa. He particularly distinguished himself as District Engineer-in-Charge of the building of the Oudtshoorn-Port Elizabeth line (1910-13), which surmounted the great Montague Pass, a work which called for very considerable engineering skill and resource. In 1920 he was appointed Assistant to the Chief Civil Engineer at Railway Headquarters in Johannesburg, and became Assistant Chief Civil Engineer in 1922. Mr. Watermeyer was promoted to be Assistant General Manager of Railways, System B, at Bloemfontein in 1925, and in 1927 was transferred to System A, Cape



Mr. T. H. Watermeyer, M.Inst.C.E., M.Inst.T.
General Manager, South African Railways & Harbours,
1933-1941

Town, in a similar capacity. He was at the same time in charge of the electrification of the Cape Town suburban line. He became Assistant General Manager (Technical) in April, 1928, and was appointed to act as General Manager on February 1, 1933; the appointment was confirmed in September of the same year. Mr. Watermeyer is a Member of the Institution of Civil Engineers and of the Institute of Transport; the first Overseas Vice-President of the Institute of Transport, a position he held from 1936 to 1939; and an Associate Member of the Institution of Electrical Engineers. He is a Past President of the South African Society of Civil Engineers.

We regret to record the death of Mr. David L. Gray, Consulting Vice-President (Traffic), Erie Railroad, New York, on February 11, at the age of 71.

We regret to record the death of Mr. R. J. Moffat, on February 12 at Winnipeg. Mr. Moffat, who was 68 years of age, was a director of the Canadian National Railways.

Mr. Percy Cambridge, Parcel Agent, Paddington, has been appointed an Assistant Divisional Superintendent, London Division, G.W.R.



Mr. Watermeyer at his desk

TRANSPORT SERVICES AND THE WAR—84

Easter arrangements—L.M.S.R. salvage—Air raid damage in Germany—Kiel canal and Danube bridges—Railways and the East African campaign—Traffic through France to Germany

The Government has decided that it will best serve the interests of war production if workpeople in general have a short break at Easter time. This should be taken in England and Wales between the usual stopping time on Saturday, April 12, and Tuesday morning, April 15. In Scotland the corresponding holiday will be the usual spring holiday. The Government statement said that as far as possible there should be no cessation of work on Good Friday, April 11. The provisions of industrial agreements with regard to payment for work done on any of these days should, of course, be observed. The Government emphasises that, although it wishes workpeople to have a short rest at Easter time, all road and rail communications must be kept clear of additional passenger traffic. There will be no special travelling facilities. Members of the public are asked in every possible case to arrange to spend their holiday without travelling. The law regarding the payment of Bills of Exchange will not be affected by these arrangements. With the exception of bills at sight or on demand (such as cheques), bills of exchange due on Good Friday will, therefore, be payable on Thursday, April 10. The Minister of Health, Mr. Ernest Brown, has asked local authorities in both evacuation and reception areas to do all they can to impress upon parents and householders the risks of encouraging the return of children to evacuation areas during the Easter holidays.

Easter Travel to Ireland

The London Midland & Scottish Railway Company, the Belfast Steamship Co. Ltd., and Burns & Laird Lines Limited gave notice on March 30 that, owing to the limited accommodation on their steamers, it will not be possible to accommodate all the passengers who may wish to travel to Ireland between April 10 and 13, both dates inclusive. The companies will not, therefore, issue rail and steamer tickets for travel to Ireland between these dates unless the intending passenger is in possession of a "sailing" ticket obtained in advance. The notice added that application for "sailing" tickets (issued free of charge) should be made at least 10 days before the date of the proposed journey and must state the proposed date of travel together with an alternative date. The possession of a "sailing" ticket does not exempt a traveller from the necessity of applying for an exit permit.

Mobile Southern Railway Information Booths

In addition to the enquiry booths provided at the London termini and a number of suburban stations for giving information to passengers regarding alterations necessary from time to time in the train services, spare booths are kept on hand in London fully equipped with the necessary literature for despatch at a moment's notice to any large town on the Southern which has suffered a blitz. The idea is that the enquiry booth, manned by competent staff, shall be immediately installed at a point likely to be of most assistance to the public and, in the event of transport services being interrupted, full information given regarding the available services or alternative routes.

Medical Aid Posts for Tube Shelterers

Medical aid posts are at present in service at the 79 London Transport tube stations at which shelterers take refuge from air raids. Each post includes a consulting space, an isolation bay with bunks for the temporary accommodation of any infectious cases, supply of water, electric heating for sterilising instruments, cupboards for surgical instruments and dressings, and bunks for the nurses. Most of the posts are situated on the platforms. A standard layout was reproduced at page 75 of our January 17 issue. The Ministry of Health, Lord Horder's Committee, the Metropolitan Borough Councils, the British Red Cross Society, the St. John Ambulance Brigade,

and the London Passenger Transport Board, have co-operated in planning the posts. The medical service is provided by the councils, who appoint a medical officer to each station, which he visits every night. The councils also appoint a hospital nurse to be in charge of each station and enlist the aid of the British Red Cross Society and the St. John Ambulance Brigade in obtaining auxiliary nurses, many of whom are paid for their work.

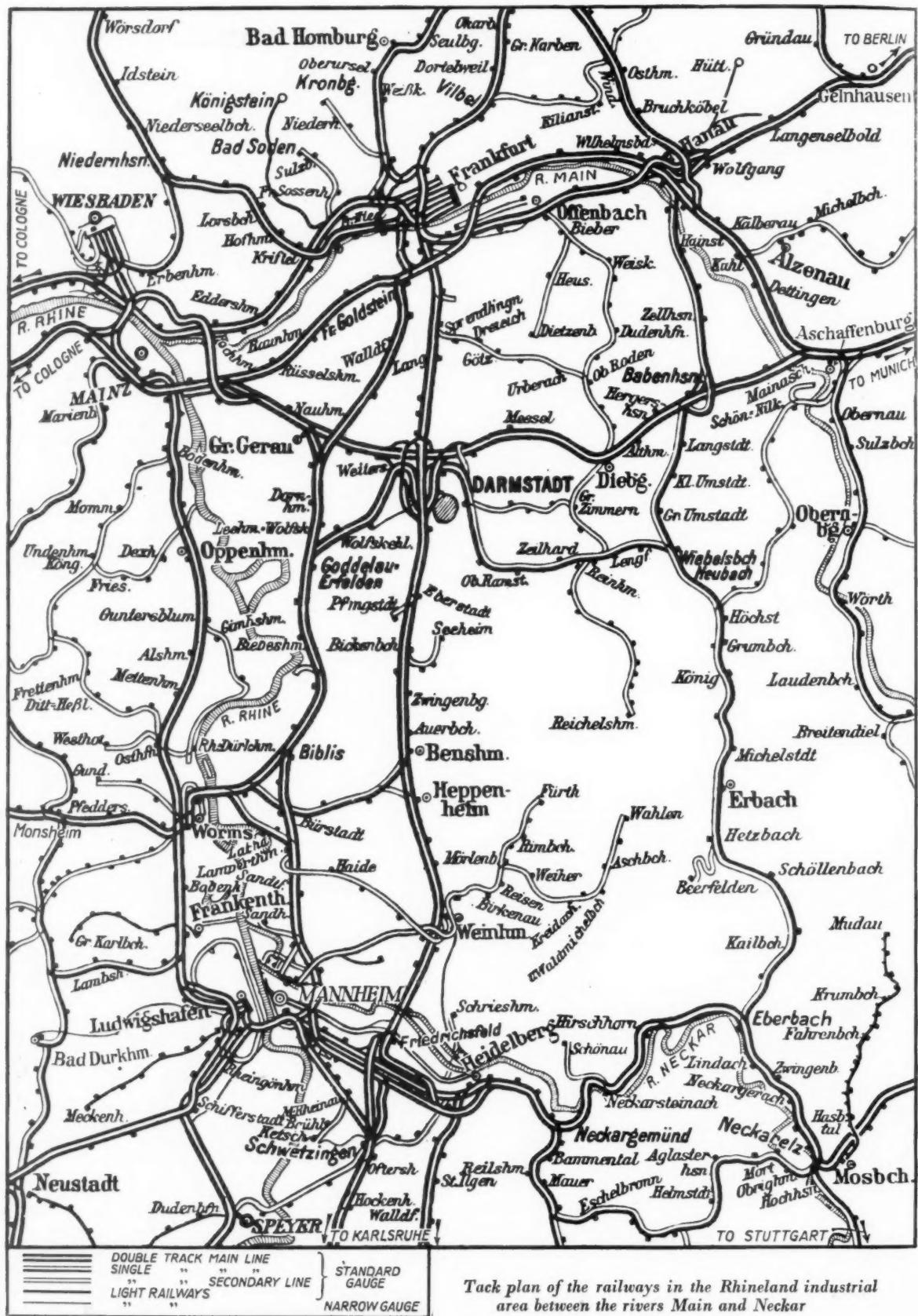
Tube Tunnel Shelters

Work was begun some little time ago on a number of the tube tunnel air raid shelters to which Mr. Herbert Morrison referred in his broadcast talk on November 3 last when he outlined the Government shelter policy and said that the deep level shelter accommodation provided in London by the tube stations was to be extended by tunnelling. We understand that such shelter tunnels are being driven at ten tube stations and that they will be fitted with bunks and equipped with washing facilities and medical aid posts. All ten are expected to be finished by the end of the present summer, and they will provide deep-level shelter for about 100,000 persons. The possibility of the use of these tunnels, after the war, for tube running lines has been borne in mind.

L.M.S.R. Salvage Drive

On a number of occasions reference has been made in THE RAILWAY GAZETTE to the thorough manner in which the railway companies have organised the salvage of materials on their systems. In the case of the L.M.S.R. it was recorded at page 210 of our August 23, 1940, issue that nearly 46,500 tons of miscellaneous salvage had been recovered by railwaymen throughout that company's organisation during the first six months of the intensive salvage drive, which is under the direction of Mr. W. H. Vine, Salvage Officer, and in co-operation with the Ministry of Supply's Controller of Salvage. Eighty special depots for the reception, sorting, and grading of miscellaneous salvage are in operation at various places on the L.M.S.R. By films, posters, and magazine articles the salvage habit in respect of every conceivable item is being inculcated by the L.M.S.R. into its 230,000 railwaymen in all parts of the country. In THE RAILWAY GAZETTE of March 28 we recorded that the company had set up what was believed to be the first stationery reclamation depot in the country, whereby it was reclaiming used paper and envelopes at the rate of 100 million pieces a year, and that so successful had this effort already proved that the L.M.S.R. was opening a second reclamation depot in Glasgow to cover the whole of Scotland.

On March 26 we were afforded an opportunity of seeing a film on salvage which has been made by the L.M.S.R. Advertising & Publicity Department, and of which brief mention was made in our "Notes and News" section for March 28. This film began its official tour of many points on the company's system on Monday last. Lord Stamp (Chairman, L.M.S.R.), Mr. Ashton Davies and Sir Ernest Lemon (Vice-Presidents, L.M.S.R.), Mr. G. H. Loftus Allen (Advertising & Publicity Officer, L.M.S.R.), Mr. C. Grasemann (Public Relations & Advertising Officer, S.R.), Mr. G. Dyall (Advertising Officer, G.W.R.), and a number of officers of the L.M.S.R. were present at the showing of the film, and the audience also included Mr. H. G. Judd, Controller of Salvage for the Ministry of Supply, and several officials from the Ministry. The purpose of the film is to offer guidance to members of the L.M.S.R. staff as to the best means to be adopted in furthering the company's salvage campaign, and to impress upon employees the importance to the national war effort of the reclamation of the vast variety of articles discarded during peacetime as waste. The film opens with an address by Lord Stamp stressing these points and goes



Tack plan of the railways in the Rhineland industrial area between the rivers Main and Neckar

on to show the best means by which the precepts may be put into practical effect. Scenes are shown of the various phases of the company's activities which could be turned to good account in the search for salvage, and methods of collection at numerous typical points on the system, and the bagging and sending of the salvage to central depots are demonstrated.

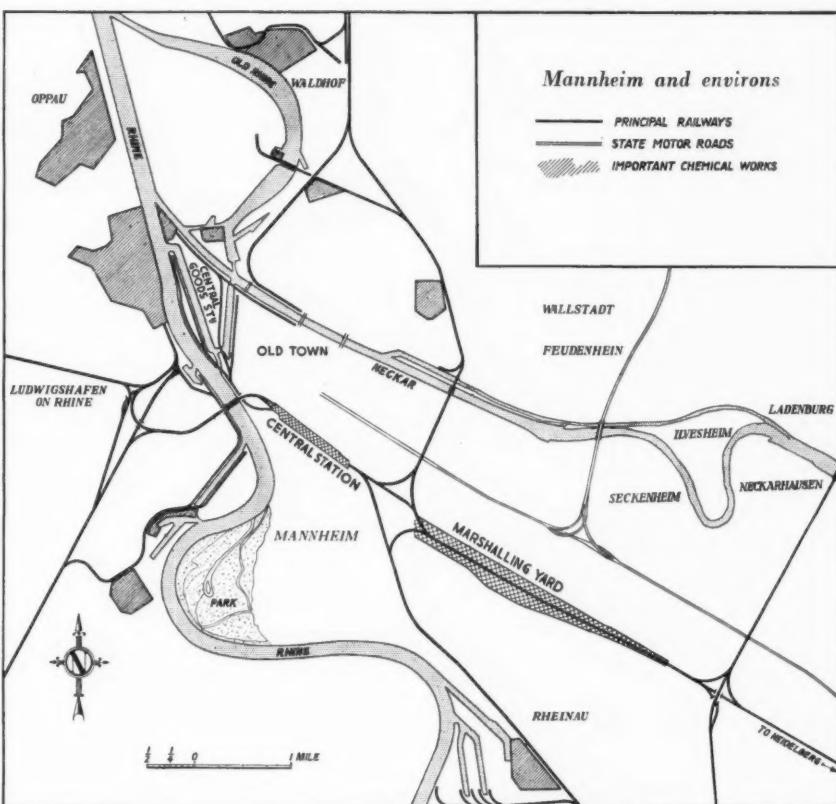
Armistice Coach on Show in Berlin

The historic railway coach in which Armistice terms were signed at Compiègne in 1918, and again on the collapse of France last year, was opened to public inspection in the Lustgarten in Berlin on March 23 "by permission of the Führer." The career of this famous vehicle was outlined at pages 898 and 905 of our June 28, 1940, issue.

Air Raid Damage in Germany

The Ministry of Economic Warfare has recently collated information received through reliable sources and as the result of aerial survey by the R.A.F., giving a fair account of the main industrial damage done to Germany by R.A.F. raids in December and January. We gather that the Ministry of Economic Warfare hopes this will be the first of a monthly series of such stories designed to give a balanced account of the results of our industrial bombing which are not easy to assess solely from the day-to-day communiques of the Air Ministry. The official statement says that despite restrictions imposed on bombing operations by bad weather, there is every reason to believe that the R.A.F. succeeded in inflicting some substantial damage to Germany's war effort during December and January, and that this in fact exceeded the damage which Germany inflicted on Great Britain. Reports from Berlin indicate that the raids on that city on December 15 and December 20 were the most effective up to that time. Heavy bombs penetrated to the underground railway and brought traffic to a standstill on the important section between the Wittenberg Platz and Zoologischer Garten stations, which a scrutiny of the map published at page 335 of our May 21 issue shows to be a point of considerable strategic value inasmuch as it marks the junction of three sections of the underground railway system. Hits were also obtained on the important railway junction between the Schöneberg and Papestrasse stations where the Südringbahn joins the line to the Potsdamer terminus. Although railway damage is in most cases quickly repaired, the Ministry of Economic Warfare states that there is reason to believe that this incident caused considerable dislocation by reason of the importance of the junction and the fact that a train was involved.

Mannheim, the most important industrial and commercial centre of the middle Rhine, was heavily attacked in the week before Christmas. The port is the largest inland port in Europe after Duisburg-Ruhrort, and the Ludwigshafen docks are claimed to constitute the largest inland port on the left bank of the Rhine. Several hits were scored on both the main passenger station and the main goods station. In the goods station, also, an ammunition train was destroyed with widespread effect. Apart from the main station, the Ludwigshafen and Waldhof stations were also involved; the former was set on fire and the engine sheds were also hit. Altogether some 15 hits were scored on railway tracks in various parts of the Mannheim area. One of these severed the connection across the Rhine between Mannheim and

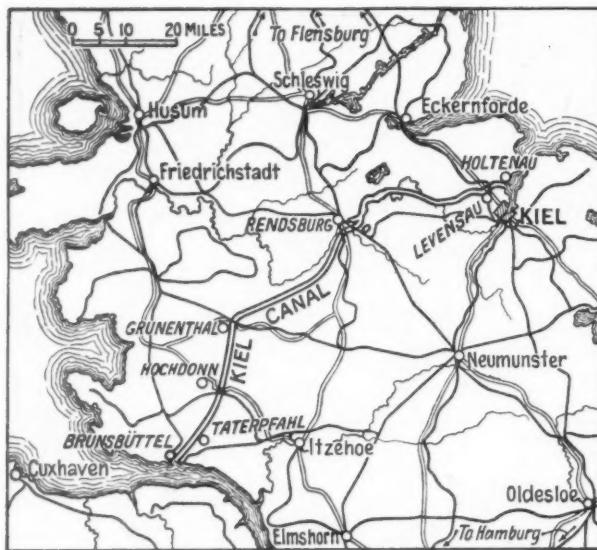


Ludwigshafen for some days. Traffic eastward had to be diverted from the Mannheim area and routed through Karlsruhe—not a serious diversion in point of distance but probably the cause of considerable inconvenience as Karlsruhe itself was heavily laden with traffic.

The Kiel Canal Bridges

The recent heavy R.A.F. raids on North German seaports have frequently been directed against the great shipyards and docks of the Baltic naval base at Kiel, and other points in the neighbourhood of the Kiel canal. Docks and industrial targets at Kiel itself were attacked for the 35th time on the night of March 23-24, and the North Sea naval base at Wilhelmshaven received its 46th raid on the night of March 18-19.

The Kiel canal, which is 60 miles long and links the North Sea and the Baltic, was completed in 1896, but the launching of the first British Dreadnought ten years later severely restricted its use for German naval purposes, as battleships of equal armament and size were bound to have a greater draught than 29 ft., which was the depth of the canal. The reconstruction immediately undertaken by the German Government involved not only the widening (to 335 ft.) and deepening (to 37 ft.) of the waterway and the enlargement of the entrance locks at Brunsbüttel and Holtenau, but also the reconstruction of the railway crossings. The original canal, 213 ft. in width, was spanned at Rendsburg by two swing bridges, each carrying one track of the Rendsburg-Neumünster line. At Grünthal, a single-span arch carried the West Holstein line and a road for general traffic. The Kiel-Eckernförde road and the Kiel-Flensburg line crossed on another single-span bridge at Levensau, about four miles from the Baltic entrance to the canal. A fifth crossing was that of the Elmshorn-Hvudding line at Taterpahl, three miles from Brunsbüttel. The bridges at Grünthal and Levensau were already high-level bridges, allowing a free passage for ships of some 130 ft. between the underside of the bridge and water level, and the new bridges for the Rendsburg and Elmshorn lines were also to be at the high level. As the country through which the canal passes at these



Sketch map showing position of Kiel canal bridges

points is flat and marshy, it was necessary in each case to construct gigantic approach gradients. At Rendsburg these are nearly three miles long, beginning with spiral earth embankments. At the points where these return upon themselves begin the steel viaducts, some 2,500 metres (2,734 yd.) in length. The great central span across the canal is in the form of a steel suspension girder, with two cantilever bays connected to the approach viaducts. From the underside of the deck, carrying the double railway track, is suspended a transporter bridge for road vehicles and foot passengers. The bridge at Taterpahl was replaced by the high-level one at Hochdonn. This has approach ramps and viaducts similar to Rendsburg, but is some 300 metres (328 yd.) shorter. Here each alternate bay of the viaduct is cantilevered out from the deep lattice girders of the adjoining bays. The supporting legs straddle widely, and each is carried on a universal joint. The Holtenau bridge is similar in design, but the supports of the central span across the canal are exceptionally slight, being constructed with universal joints at both top and bottom. Of the two single-span bridges, that at Grünthal is the more interesting. Here the single-line railway and the roadway occupy the same deck, and the decking is supported by two segmental girders, which are not set vertically but lean towards one another. Illustrations of the Rendsburg, Hoch-

donn, and Grünthal bridges are reproduced on page 398, and give an impression of the magnitude of the structures.

Railway Bridges over the Danube

The increasingly tense military situation in the Balkans gives topical importance to the transport facilities in that area, outstanding among which are the bridges across the lower reaches of the River Danube, one of the greatest rivers in Europe and the only great one to flow from west to east. Before the many political and boundary changes which began with the Munich settlement, it passed through or touched seven countries, namely: Germany, Austria, Czechoslovakia, Hungary, Jugoslavia, Bulgaria, and Roumania. The river is approximately 1,771 miles long from its source at the union of two streams, the Brigach and Brege, at Donaueschingen in the Black Forest about 2,180 ft. above sea level, to the Black Sea. It drains a basin estimated at 300,000 sq. miles and is navigable from Ulm, where it is joined by the Iller; below there it has 300 tributaries. While forming a valuable means of communication, it is naturally a hindrance to cross traffic unless bridged or tunnelled, and there are 29 railway bridges across it, of which 20 are in Germany and Austria, and 5 in Hungary. In Jugoslavia the river divides the north-eastern provinces from the greater part of the country and there are three railway bridges, one at Belgrade and the others at Bogojevo and Novisad. Thence onwards there is only one more railway crossing, at Cernavoda in Roumania. There are none on the 143-mile stretch common to Roumania and Jugoslavia, nor on the section which provides the frontier between Roumania and Bulgaria; this impedes communication between Sofia and Bucharest, especially in winter. In the past, plans have been considered for making bridges between Turnu-Severin and Kladovo, between Calafat and Vidin, and between Giurgiu and Russe, to overcome these difficulties, but they appear to



Sketch map of the railways of Jugoslavia

have been dropped. The river varies from $\frac{1}{2}$ to $1\frac{1}{2}$ miles wide on these frontiers of Roumania with Jugoslavia and Bulgaria, and a permanent bridge would be costly. The German Forces are reported to have arranged a number of pontoon bridges for the passage of their equipment.

Jugoslav and German Treaty

Uncertainty as to the relationship between Jugoslavia and Germany culminated in the signature in Vienna on March 25 by M. Tsvetkovitch, the Prime Minister, and M. Cincar-Markovitch, the Foreign Minister of Jugoslavia, of a protocol to the Tripartite Pact signed between Germany, Italy, and Japan on September 27, 1940, in Berlin. Public opinion in Jugoslavia, however, which had been strongly opposed to alignment with the Axis Powers while the pact was in contemplation, resulted in widespread demonstrations of protest immediately the signing became known. At 2.30 a.m. on March 27 the Jugoslav Armed Forces deposed Prince Paul, the senior Regent, and all members of the Jugoslav Government and proclaimed the assumption to power of King Peter, who comes of age on his eighteenth birthday in September next. General Simovitch, Chief of the Air Force, formed a new Government and declared his policy to be the maintenance of order in the country and peace abroad. Railway communication between Jugoslavia and Roumania was suspended on Thursday, March 27, and the whole of that frontier closed by the Jugoslav Government on March 31. Since March 27, also, railway traffic between Jugoslavia and German Austria has been severely restricted, and on March 30 that frontier was closed by the Jugoslav authorities.

Russia—Hungary Railway Line Opened

The first direct train since the outbreak of war in 1914 arrived in Budapest from Russia on March 23. It was a special train from Moscow bringing 56 Hungarian war flags captured by the Russians in 1849, and a message from Budapest says that symbolic gesture was greatly appreciated in Hungary. A second line, *via* Korosmeszo, will be opened, and also a direct air route.

New Hungarian Railway Link

To establish a direct railway connection between Hungary's old territory and the south-eastern region of the Transylvanian zones attached to Hungary in October last (as the existing railway connection traversed in part Roumanian territory), the Hungarian army built a 10-mile narrow-gauge connecting line between Marosvásárhely (the Hungarian name for the Roumanian town of Targu Mures) and Kolozs-nagyida. Work was taken in hand in October last and traffic has been carried since December 15; the official inauguration of the line took place on December 21. Hungarian transport in relation to recent territorial acquisitions formed the subject of some notes at page 259 of our March 7 issue.

Railway Rehabilitation in Western Ukraine

In the Western Ukrainian territory seized by Soviet troops during the latter stages of the German invasion of Poland, a large mileage of railways and considerable quantity of railway property and equipment were temporarily put out of action. Altogether, 250 miles of line, 27 stations, 7 locomotive depots, 19 bridges, and many workshops and other buildings were demolished or seriously damaged in the Drohobycz District, but by September last they were all stated to be repaired and in service again. Also, nearly 50 per cent. of the rolling stock in that district had been rendered unserviceable, but it, too, was all said to be in running order once more by that time, when the district generally was again working smoothly.

The New Slovak Railway

German railway circles report considerable interest in the opening of the 45-km. (28-mile) Slovak railway line between Neusohl (Banska Bystrica) and Oberstuben (Dolna Struba) on December 19, 1940, to which brief reference was made at page 275 of our March 14 issue. Construction was begun in September, 1936, and by March 14, 1939, about 67 per cent. of the construction work had been finished, while early in December, 1940, the line was entirely completed. The con-

struction costs are stated to have amounted to a total of 445,000,000 crowns. The new line cuts through difficult terrain in the Tatra Range, where considerable differences in altitude had to be overcome, and 22 tunnels were necessary. The shortest tunnel is 41 metres (45 yd.) in length, while the longest, now named the Hlinka tunnel, is 4,689 metres (5,128 yd.). In addition, there are more than 100 viaducts. At one time 12,300 workmen were engaged on the work, in addition to 5,700 workmen on the tunnelling. German authorities state that the new railway line is of utmost importance to Slovakia, permitting the solution of traffic problems which had delayed the natural development of the region now served.

French Traffic to Germany

The extent of the Vichy Government's enforced collaboration with Germany, and the one-way form of that collaboration is illustrated by information which has reached London recently, and has been issued by the Ministry of Economic warfare. This is a transport programme for the month ended January 15 for goods carried by the French railways (in the unoccupied as well as the occupied zones) to Germany or other German-occupied countries. The following are some of the interesting items on the list:—

Goods	Destination	Tonnage	Order of priority
A. From Unoccupied France—			
Oats	Belgium and Occupied France	90,000	1-2
*Lead (from occupied and unoccupied zones)	Essen, Treves, Ruhr	45,000	1
Straw (from both zones)	Belgium	37,750	1
Hay	"Occupied territory"	78,750	1
*Leather	Central Germany	17,250	1-3
*Bauxite	Dresden	7,500	1
*Aluminium (in pigs)	Dresden	9,300	Absolute priority
†Fluorspar (for metallurgy; from both zones)	Eastern Germany, Ruhr, Essen	38,272	Absolute priority
†Manganese	Ruhr, Essen	6,300	1
Oil and grease	Germany	1,125	2
Coffee	Central Germany	3,000	4
*Slaughtered pigs	Cologne	1,220	1
B. From Occupied France—			
Coal	German Army	150,000	1
	Alsace-Lorraine	125,000	2
Iron scrap	Germany	22,500	1
*Cattle for slaughter (from Paris)	Alsace-Lorraine	2,400	1
	German Army	25,765	1
*Grain	Mannheim, Duisburg	75,000	1
*Cotton	South and West Germany	5,625	1
*Whale oil	West Germany	6,750	2

Items marked * are of particular importance in view of Germany's known shortages, those marked † in view of her supposedly plentiful supply of them.

Train Services in Unoccupied France

The following impression of travel in unoccupied France was given in *The Sunday Express* of March 23 by Joan Slocombe in the course of an article on her experiences during an extended visit:—

"The best thing in France today is the trains. They run almost invariably on time. And, above all, you hear all the news there. As people do not believe what they read in the newspapers, they are avid to hear the news brought from travellers from other parts. There I have even met escaped British prisoners. One Welshman I met was an ex-policeman who was taken prisoner by the Germans in Flanders, but as he was a good motor mechanic they gave him a job at a garage. He repaired their cars, and also sold their petrol to French peasants until he had enough money to buy a new suit of clothes and pay his railway fare to Paris, from where he escaped into the unoccupied zone. He said that the British prisoners were much better treated than the French."

"But the swiftest of all news to spread over France was the news of British victories. When people knew I was British they just never tired of talking of their admiration for the resistance of the London people. In trains they don't talk much of individual British personalities, either military or political—it is just the people of London who have gripped their admiration, because the French know only too well what it means to have entire towns wiped out."

Blue Trains as One-Night Hotels

It is reported that the rolling stock of the famous Blue Trains, which formerly ran between Calais and the French Riviera, has been split up and the sleeping cars distributed between Vichy, Lyons, Marseilles, and Clermont-Ferrand. They have been placed in sidings and are now used to accom-

modate passengers who have to spend the night at these points in order to catch train connections in the morning. In view of the fact that the compartments are provided with all comforts—even telephones have now been installed—they are extremely popular with guests unable to find hotel accommodation. No traveller is allowed to remain for more than one night. The price charged is stated to be that of a first class hotel. In the towns in question, the ordinary hotels are said to be overcrowded.

The Railways at Kassala

The recapture on January 19 by British Imperial Forces of Kassala near the border of the Anglo-Egyptian Sudan and Eritrea, and the subsequent invasion from Kassala of Italian East Africa, give topical interest to the method of construction of the two sections of line meeting at Kassala which provide an alternative route between Port Sudan to the Red Sea and Sennar. These lines were built primarily to serve the important cotton interests of the Kassala area. An arrangement was made between the Kassala Cotton Co. Ltd., and the Sudan Government whereby the Kassala Railway Co. Ltd. was incorporated as a private company on November 7, 1922; it was converted into a public company in December of the same year. The company's railway—about 217 miles in length—was built and is operated by the Sudan Railways under an agreement of December 7, 1922. It extends from a junction with the main lines of the Sudan Railways at Haiya to Kassala, and on the expiration of the concession (on December 31, 1953) the railway and works become the property of the Sudan Government without payment. The Kassala Railway Company was assisted by an arrangement under the Trade Facilities Act whereby the British Government guaranteed the principal and interest on 4½ per cent. debenture stock up to a limit of £1,500,000, nearly all of which was issued. In addition, the Kassala Cotton Co. Ltd., as an important interested party, subscribed 300,000 £1 shares of the Kassala Railway Co. Ltd., and agreed to hand these over to the Sudan Government without payment on the opening of the line for traffic. The railway, which entailed the erection of 63 bridges, was formally opened on April 23, 1924. Its completion was a complement to the irrigation works at the Gash delta of the Kassala Cotton Company.

Somewhat similar arrangements were adopted in connection with the further section of railway from Kassala to Gedaref and Sennar. In this case the Gedaref Railway & Development Co. (Sudan) Ltd., was incorporated on November 20, 1926, and originally was granted the right under a concession from the Sudan Government to build and equip a single-line railway, and to work it until March 31, 1962. Again, the Trade Facilities Act was evoked to provide for the British Government to guarantee the principal and interest on 5 per cent. debenture stock up to a limit of £2,160,000. A sale agreement of January 13, 1927, provided for the Sudan Government to buy the line and works. The railway from Kassala to Gedaref, 135 miles, was opened for traffic during November, 1928 and an extension from Gedaref to Makwar (Sennar), 148 miles, on February 15, 1929.

Railways of Italian East Africa

In the development of her East African colonies Italy seems to have attributed more importance to roads than to railways. A vast network of roads has been constructed since the Abyssinian campaign, in many cases over difficult mountainous country, but comparatively little has been done to extend or improve railway communications. Nevertheless, the railways that have been built are of considerable strategic importance and the events of the past week have placed the effective control of those in both Eritrea and Abyssinia in the hands of the British Imperial Forces. After a siege of 7 weeks Keren (Cheren) was captured on March 27, and our Forces then proceeded along the line of the railway to Asmara, the capital of Eritrea, which capitulated without resistance on April 1. In Abyssinia the same Forces which had previously captured the Mogadiscio Railway and had then proceeded northward by road into Abyssinia, captured the important strategic town of Harar on March 27, bringing the Abyssinian Railway within easy range of our attack. Actually, Dire Douah, an important point along the railway, was abandoned by the Italians and occupied by our Forces on March 29.

THE ERITREA RAILWAY

In Eritrea there is one line of railway crossing the colony from east to west. This line, the gauge of which is commonly described as metre, but actually is 0·95 m. (3 ft. 1½ in.), runs from Massaua, the Red Sea port, through the capital, Asmara, to Keren, Agordat, and Biscia, a total length of 343 km. (213 miles). The first section, Massaua-Asmara, 118 km. (73 miles) is over difficult country, ascending from sea level to 7,683 ft., with 30 tunnels, many curves, and gradients of as much as 3½ per cent. The second section, Asmara-Agordat, 190 km. (118 miles) is on an easier location, falling, over 2½ per cent. grades, to 1,988 ft. The third section, Agordat-Biscia, 35·5 km. (22 miles) is part of the proposed extension to Tessenai. Nine Fiat *littorine* railcars were put in service in 1938, and in that year the railway carried 534,293 passengers.

The history of the Eritrea Railway began in 1887, when, with a view to facilitating the Italian occupation of the country, the construction of a railway from the port of Massaua into the hinterland was decided upon. Due to the Italian military and political reverses in Eritrea, the line was built for only about 16½ miles from Massaua, and work was not resumed until 1901. The railway was opened to Ghinda in 1904, and reached Asmara in 1911. It was extended to Keren in 1920 and to Agordat in 1922. A further section to Biscia (part of a very much longer proposed extension) was completed in May, 1930, but was never opened to traffic in view of the development of road transport.

THE MOGADISCIO RAILWAY

In Italian Somaliland there is the railway from the Indian Ocean port of Mogadiscio to the industrial colony of Villaggio Duca degli Abruzzi. This line, also on the 0·95 m. gauge 113 km. (70 miles) long, and its extension to the Abyssinian frontier had been planned. Except for the initial climb out of the coastal region, the location is an easy one, with but few severe grades or curves. From the present terminus of the main line, a 0·60 m. (2 ft.) deauville line, constructed for military purposes during the Abyssinian campaign, runs 130 km. (81 miles) to Bulo Burti. The main line carried, in 1937-38, 226,604 passengers and 29,668 tons of goods, but in 1938-39 the traffic declined to 194,230 passengers and 18,548 tons of goods.

THE FRANCO-ETHIOPIAN RAILWAY

In Abyssinia there is the Djibouti to Addis Ababa railway. This line, which was built and belongs to a French company, the Cie. du chemin de fer Franco-Ethiopien, connects, as its name indicates, the port of Djibouti, on the Red Sea, with the capital of Abyssinia. It is 784 km. (487 miles) in length, of which 90 km. (56 miles) is in French Somaliland and the remainder in Abyssinia. The gauge is 1 metre, the maximum gradient is 3 per cent. and the minimum curvature, 100 metres. There is one tunnel, of 130 m. in length, and three metal viaducts, of 142, 156 and 151 metres, the last-named that over the Auasc. Outside the termini, Dire Douah is the only station of importance, serving the important town and district of Harar, besides being the midway stop and change-over station for passengers and trainmen. Traffics in recent years are recorded as follow:—

Year	Passengers	Goods, tons
1935	110,689	76,274
1936	181,010	116,527
1937	279,332	153,072
1938	412,230	122,230

The increase in passengers is solely in local traffic and in short journeys, and the receipts under this head actually fell from fr. 13,559,018 in 1937 to fr. 13,542,402 in 1938. Preliminary figures for 1939 showed a further reduction under both heads of traffic, due no doubt to the ever-increasing use of roads and the diversion of imports from the port of Djibouti to those of Massaua and Mogadiscio. A map of the East African railways was published in THE RAILWAY GAZETTE of January 24 last.

Several aerial cableways have been constructed in Italian East Africa within the last few years. The most important of these is the one between Massaua and Asmara, 71·8 km. (44½ miles) in length. It was opened in March, 1937, and was intended to relieve the congestion in the port and on the railway. The working capacity of the cable is 300 tons a day of 10 hours, and costs are said to be very low. Other aerial

cableways are those of Dante (Hordio) and Amara, and there are also some shorter privately-owned industrial cableways.

Improving Communications between Burma and China

The British Government, after consultation with the Government of Burma, has agreed to provide the funds to enable Burma to build a railway line from Lashio to the frontier. This line will link up the railway system of Burma with that of China. Brief details of this project were announced in the House of Commons on April 1 by Mr. L. S. Amery, Secretary of State for Burma, in reply to Sir John Wardlaw Milne, who asked whether any steps were being taken to improve communications between Burma and China. Mr. Amery informed the House that the Chinese Government had for some years stressed its desire to improve com-

munications between the two countries. The road between China and Burma was opened in 1938, but, in view of the limitations of road traffic, the Chinese Government had consistently impressed the need for railway communication and had begun building a railway to the Burmese frontier. After discussion with the Government in Burma, the British Government had agreed to provide funds to enable the Government of Burma to build a line from the railhead at Lashio to the frontier which would link up the Burma railway system with that of China. On the same day Mr. Butler, Under-Secretary of State for Foreign Affairs, said that, as the result of Japanese bombing attacks on the Salween and Mekong bridges of the Burma road, there had been a certain interruption of traffic, but repairs had been effected and he understood that the road was open to traffic over its entire length.

RAILWAY AND OTHER REPORTS

Beira Railway Co. Ltd.—Net earnings for the year ended September 30, 1940, were £453,005 (against £498,033); net profit was £125,749 (against £173,127); £20,000 is again transferred to dividend equalisation fund. The dividend is repeated at 2s. a share, less tax.

Great Indian Peninsula Railway Annuities.—The report for the year 1940 shows that the annuity received from the Secretary of State amounts to £1,155,205 net, against £1,183,512. The net amount payable to annuitants Class A, is £219,582, against £225,008, and to Class B, £636,920, against £659,803. The sinking fund from annuity, Class B, remains the same at £290,606.

Liverpool Overhead Railway Company.—Net revenue for the year 1940, after provision for E.P.T., was £5,001 (against £10,994). Debenture interest, together with debit balance on revenue account brought forward from 1939 (£3,295), amounted to £10,050, leaving a debit balance of £5,049 to be carried forward. Railway gross receipts were £102,323 (against £75,605) and expenditure was £103,914 (against £70,530), giving a deficiency of £1,591 compared with the credit balance of £5,075. Miscellaneous receipts (net) were £6,592 compared with £5,919.

West Yorkshire Road Car Co. Ltd.—This company is controlled jointly by the L.N.E.R. and L.M.S.R. companies and Tilling & British Automobile Traction Limited. In the year 1940 traffic receipts and other income, less operating and management, and general expenses, amounted to £447,821 compared with £401,792 for 1939. Fuel taxation and vehicle licences took £50,549 (against £71,023), income tax and provision for Excess Profits Tax absorbed £186,604 (against £102,018) directors' fees were £2,410 (against £2,400), transfer to depreciation reserve was £60,614 (against £128,978) and £50,000 (against nil) was put to reserve for contingencies. The net profit was £97,645 (against £97,373). Dividend on the ordinary shares is again 10 per cent. for the year. The

balance carried forward is £24,438 (against £18,543). The garage and bus station at Scarborough have been completed and air raid shelters at the company's works and principal depots have been completed.

The Undertakers of the Aire & Calder Navigation.—The report for the year 1940 shows a balance of £45,775 on revenue account, against £138,574 in the previous year. No dividend is declared and £58,176 is carried forward.

Keighley-West Yorkshire Services Limited.—Net profit for the year to September 30, 1940, was £16,981 (against £22,054). The balance is divided between Keighley Corporation and the West Yorkshire Road Car Co. Ltd.

Baldwins Limited.—Profit for 1940 amounted to £360,412, as compared with £403,779 in the previous year, and a dividend of 10 per cent. is announced (same).

A. Reyrolle & Co. Ltd.—Net profits for 1940 amounted to £169,471, against £162,218 for 1939. A final dividend of 7½ per cent. on the ordinary capital makes 12½ per cent. for the year 1940, the same as for 1939.

P. & W. MacLellan Limited.—Net profit for 1940, after tax, was £45,939 (against £52,493). The directors propose to transfer £10,000 to depreciation and £15,000 to reserve (same), and the dividend is again 6 per cent.

Hoffmann Manufacturing Co. Ltd.—The directors report net profits for the year 1940 of £237,776 (against £250,760) and recommend a final ordinary dividend of 10 per cent., free of tax, making 17½ per cent. for the year (same).

Thos. Firth & John Brown Limited.—Net profit for the year, after providing for interest, depreciation, taxation, deferred repairs, war damage contribution, and contingencies, amounted to £390,822, compared with £508,459 in 1939. A final dividend of 6½ per cent., free of tax, is recommended, making 12½ per cent. on the

ordinary shares, as against 17½ per cent. free of tax for 1939.

Clayton Dewandre Co. Ltd.—Profit for the year 1940 was £182,058 (against £80,578). The directors maintain the ordinary dividend at 10 per cent., including the interim payment of 4 per cent. A transfer of £5,000 is made to general reserve and £8,000 is added to undivided profits account; £8,819 was carried forward (against £8,383).

Manganese Bronze & Brass Co. Ltd.—A first and final dividend of 25 per cent., less tax, on the ordinary capital will be paid on April 25. Net profit for 1940, before reserving £78,000 for E.P.T., was £146,856. The ordinary capital was increased last year by a 200 per cent. share bonus. For 1939, the net profit was £88,824, and the dividend on the smaller ordinary capital was 75 per cent.

Vickers Limited.—The full report shows that in 1940 net profits were £1,119,120, against £1,192,041 for 1939. Contingencies reserve is again credited with £250,000, and the ordinary dividend is maintained at 10 per cent. The amount carried forward is £651,821, against £480,187 brought in.

Vickers - Armstrongs Limited.—A maiden dividend of 7 per cent., tax-free, on the ordinary capital is being paid for 1940. The profit earned was £1,963,527, after charging expenditure on A.R.P. and provision for taxation, but before charging £1,000,000 for depreciation. In 1939 the profit earned was £185,384 lower, but the net profit was £64,616 higher. The carry forward in 1940 is £209,588, against £162,838 brought in.

British Automatic Co. Ltd.—Trading profit for the year 1940 was £89,003, (against £82,520), and other income £3,504 (£3,786), making £92,507 (£86,306). The net profit after debenture interest and other charges was £48,623 (£51,256). The depreciation and renewals take £34,456 (£34,246), and the dividend of 6 per cent., less tax, absorbs £13,800. For the previous year the distribution was 4½ per cent. tax free, and absorbed £17,000. At £7,916 the carry-forward is £366 higher.

April 4, 1941

Mansion House Association on Transport

Minister of Transport at annual luncheon

The annual general meeting of the Mansion House Association on Transport was held at the Connaught Rooms, London, W.C.2, on March 27. It was preceded by a luncheon at which Sir Isidore Salmon, M.P., Chairman of the Parliamentary Committee, presided. Lt.-Colonel J. T. C. Moore-Brabazon, the Minister of Transport, was the principal guest.

Mr. W. H. Gaunt, President of the association, welcomed the Minister of Transport and other guests and said that they were watching the Ministry haulage pool with interest. If it succeeded as well as the Food Ministry's meat transport pool, or as well as the recently established pooling of railway and road rolling stock for insulated bulk meat perishable food traffic from the ports, it would make for progress not limited to the duration of the war. But it was not a jealous reminder to say that traders had steady two-way traffic requirements met in their own way which could not afford, in the general interest, to be distorted either by road or rail. The time might arrive for this aspect to be considerably reviewed.

In the railway world today there had arisen an arresting change in the present need for technical operation rather than for commercial talent. Operation of traffic under every degree of pressure was vital to its success or failure, even with existing facilities, which after all were little reinforced from peace provision and eaten into by the fortunes of war. He expressed unqualified admiration for what was being done in present limitations; at the same time he expressed the view that the planning and inter-operation of all the groups as one working whole had yet to be compassed by bold operation brains. Competitively with road, the performance by rail when two railways were concerned was often poor; if three had to handle the traffic the worst could happen. If there was an area where one could never withdraw a road service it would be found that it was a region of dual railway exchange. Railway users were suffering much more from frozen exchanges and inadequate bottle-necks than from any other general cause. Some of this was largely due to unforeseen incidences of traffic but there was a real belief that bigger scoped operative genius was one essential to hold the railways' own or the country's own, and it was still not present in good supply. Mr. Gaunt referred to various schemes which had been put forward for a reorganisation of transport facilities, in particular the suggestion made by Sir Ronald Matthews at the L.N.E.R. meeting for a National Transport Council. He said this would certainly be necessary in dealing with the reconstructed traffic in Britain after the war.

Lt.-Colonel J. T. C. Moore-Brabazon,

Minister of Transport, complimented Mr. Gaunt on his speech and suggested that he should step upon the lines and give of his great ability to the railway side of transport; most of the talent seemed to be on the road side. Mr. Gaunt had touched lightly on a variety of problems, including post-war planning, and he (the Minister) had thought that he would pass on to finance and the gold standard, but then he had sat down. The tragedy was that this robust man had to be followed by a most ephemeral body, the Minister of Transport—here today and gone tomorrow. When one was dealing with continuity of policy in transport an association which was 59 years old had to be treated with very grave respect. He would like to ask members of the Mansion House Association, this question—Why were you born? He would, indeed, have liked to have listened to the deliberations of that body right through the ages. In the early days, presumably, they had had to discuss such things as hocks and spavins, bits and harnesses. He wondered at what stage they had decided that the motorcar had come to stay.

Dealing with the Ministry of Transport's participation in the road transport industry the Minister said that a lot of the work in connection with the drawing up of that scheme had fallen upon the shoulders of Mr. Birtchnell, who was sadly missed at the Ministry during these days of his enforced temporary absence. Of the working of the scheme he could only say that the Ministry intended to run the plan in a fair and proper way without any undercutting of rates.

The situation at the ports was getting better every day and the organisation that had been set up to get traffic moving in every possible way was progressing in a manner which showed a great improvement on a few months ago. Mr. Frank Pick was conducting an intensive survey of the canal system of the country and the Ministry of Transport was not waiting for him to draw up a full and detailed report before acting on his investigations. Mr. Pick was in constant touch with the Ministry and as he passed through his points they were acted upon. It was quite impossible, of course, to reconstruct the canals, for that could only be part of a long term policy and at the moment there were neither the men nor the materials available. The end to which they were working was that every existing barge should be used upon the canals. At the same time he had to point out that canal traffic was only 5 per cent. of the whole and that however great the improvement effected might be it could not, in the very nature of things, make a very substantial difference to the transport position.

Dealing briefly with the need for co-operation between all forms of transport

the Minister said that in many industries it might be urged that competition was good and that it made for health, but competition in transport was not healthy and was not very good. It had been possible to improve a good many bottle-necks on the railway system; all sorts of extras had been built where one railway came on to another. Exchange points were the greatest weakness of the railway system today. Speaking of the tremendously increased traffic which the railways now had to carry he said that added to the demands of the services there was an enormous movement of coal. Some very concentrated planning and action had got to be taken during the summer largely to overcome difficulties of coal transport. The railways had come through a most extraordinarily difficult time and they had put up a most heroic performance. Railways were like politicians—they did extraordinarily good work, but they were cursed by everyone.

Staff & Labour Matters

Engineering Apprentices' Wages

Apprentices, boys and youths in the engineering industry had their wages increased on March 31 under agreements between the Engineering & Allied Employers' Federation and the Engineering Trade Unions. The agreements provide that the basic rates and bonus of apprentices, boys, and youths shall be based on the appropriate district rate and national bonus of the Fitter on the following percentage basis:—

Age	Percentage
16	25
17	30
18	42½
19	50
20	60

The following illustrates the application of the agreements in a district where the fitter's rate is 46s. a week with the timeworker's bonus of 30s. 6d. a week:—

Age	Base rate s. d.	Bonus s. d.	Total	
			s. d.	s. d.
16	11 6	7 7½	19 1½	
17	13 10	9 2	23 0	
18	19 6	13 0	32 6	
19	23 0	15 3	38 3	
20	27 8	18 4	46 0	

Awards for Gallantry

The George Medal has been awarded to Frederick Dainty Cox, a telephone lineman's assistant, employed by the Great Western Railway Company. Railway communications had been broken and Cox and another railwayman found that one bomb had exploded and broken telegraph wires, and a time bomb had fallen on the permanent way. After repairing the most important of the damaged telegraph circuits, Cox carried the bomb to the down side of the line and dropped it over the boundary hedge on to soft ground. Telegraph lineman Henry Stephen Newman, also employed by the Great Western Railway Company has been commended for his services.

RAILWAY AND OTHER MEETINGS

Associated Electrical Industries Limited

The annual general meeting of Associated Electrical Industries Limited was held at the office of the company, Crown House, Aldwych, London, W.C.2, on Tuesday, April 1. Sir Felix J. C. Pole, Chairman of the company, presided.

The Secretary, Mr. R. H. Haviland, A.C.A., having read the notice convening the meeting and the auditor's report,

The Chairman said: Ladies and gentlemen; Your directors have pleasure in laying before you their report and the statement of accounts for last year, and they feel that the stockholders will be gratified with the results disclosed. Before commenting on the accounts, however, I should like to tell you, and I know you will be pleased to hear, that during the last twelve months their Majesties the King and Queen have done us the great honour of visiting our largest works on two occasions. Needless to say everyone connected with the works, from bottom to top, appreciated these visits and were enormously encouraged by them, and they gave their Majesties a most hearty reception.

Next I should like to ask you to join in offering our hearty congratulations to Mr. George E. Bailey, our Works Director, on being made a Commander of the Order of the British Empire, an honour which he well deserved.

Another gratifying item in relation to the board of directors is that, since the last general meeting, Wing Commander Sir Louis Greig has been appointed a director. Sir Louis is too well known to call for any formal introduction to you. His association with the board has already proved to be most valuable and I am sure the proprietors will confirm the appointment.

Features of Accounts

Dealing now with the accounts, you will see from the profit and loss account that the gross profit for the year was £1,709,695 compared with £1,470,265, an increase of £239,430 or 16·2 per cent. over the previous year. After charging £261,283 against £234,956 for depreciation of the plant, etc., of Metropolitan-Vickers Electrical Co. Ltd. and £992,900 against £758,226 for taxation, the net profit was £21,571 lower at £455,512. You will note that we are nearing the million mark for taxation, having provided out of our profits £992,900 or 58·2 per cent. against 51·6 per cent. a year ago, an increase of £234,674. As I have said, the net profit for the year was £455,512, to this has to be added £253,118, the balance brought forward from the previous year, making a total profit available for distribution of £708,630. From this we have again appropriated £100,000 to the dividend equalisation reserve account, increasing it to £400,000, as to which I may repeat what I have said at former

meetings that our policy is to keep dividends on an even basis and thereby to retain the interest of a stable body of stockholders. The equalisation reserve now represents a little over 14 per cent. gross on our ordinary issued stock. After providing for dividends on preferred stock £60,152, there remains £548,478 and your directors recommend a dividend on the ordinary stock of 10 per cent. per annum, less tax, leaving a balance to be carried forward of £265,472, as compared with £253,118 brought in from the previous year.

Balance Sheet Strength

Dealing now with our balance sheet. You will see that creditors, loans, accrued charges, and reserves for contingencies (£5,488,567), and amounts owing by subsidiary companies (£123,814), a total of £5,612,381, show an increase of £1,737,074. The loan from bankers was paid off last year. On the assets side shareholdings and debentures in subsidiary companies, and investments other than in British Government securities, total £4,208,436, a decrease of £111,281, the reduction being due mainly to writing down the book value of certain investments. The total book value of our investments, however, is very substantially below their real worth. The stocks and materials on hand, debtors, etc., amounting to £6,550,323, show an increase of £1,181,849. Cash and British Government securities at £964,061 show an increase of £492,099.

We have again published a consolidated balance sheet showing the position of the associated group as a single unit. The most important feature to which I should direct your attention is the strength of the group as reflected by the capital reserve account and the general reserves and profit and loss accounts, which items have increased by £220,240 to £3,552,851, a total which represents 72 per cent. on our ordinary capital.

In present circumstances you will not expect me to say much about our activities. We are living in a time when deeds are more important than words. I may tell you, however, that when the Government urged manufacturers to speed up production there was a most gratifying and enthusiastic response at all the works. We are very busy, and our sole object now is to play our part in making the greatest contribution in our power towards winning the war. When peace is restored I am sure we shall be equally active in maintaining our position as leaders in the electrical manufacturing industry.

It is customary at our annual meeting to express thanks to our executive directors, officers, and all ranks and grades of employees. This year I feel that if possible we should do this even

more heartily than usual, because most splendid service has been rendered throughout a trying year. Work has been well and cheerfully done, often in dangerous conditions, and I cannot speak too highly or sufficiently express appreciation of this.

The sympathetic understanding between the management and the employees—a feature of our works—has been maintained and has contributed to the solution of the many problems incidental to war conditions.

Full use of Plant

Generally, I may say that our manufacturing plant has been maintained in excellent condition and has been fully used. Our research and engineering activities have been many and varied. The increasing need for trained personnel in industry amply justified the active educational policy pursued by the company for many years. Extensive use is being made of our training organisation and facilities, and the educational department has been most valuable in connection with the Government Training Scheme.

During the year we have extended and improved the various means of protecting our people from air raid dangers. Associated with protective measures is the highly appreciated voluntary work undertaken by a great number of our employees, who give much of their spare time to fire prevention, first aid, civil defence, and other A.R.P. services.

We are making grants to the dependents of employees who are serving with the Forces, and there is a war assistance fund for organised distribution of comforts to our people who are on active service. Last, but by no means least, I should tell you that we have done much to encourage and develop the National Savings Scheme, and we shall continue to do so.

Finally, the Metropolitan-Vickers Electrical Co. Ltd. and its employees have presented the Government with the necessary money to purchase a Spitfire aeroplane.

The report and accounts were adopted. The appointment of Wing Commander Sir Louis Greig as a director of the company was confirmed and the retiring directors, Sir John Chancellor, Sir W. Guy Granet, Mr. C. E. Lloyd, and Mr. C. H. Minor were re-elected to the board. A stockholder proposed and another seconded the re-election of the auditors and the resolution was unanimously carried. The proceedings closed with a hearty vote of thanks to the Chairman, moved by Mr. Basil Binyon and seconded by Mr. J. F. Stewart, which was carried with acclamation and to which the Chairman briefly replied.

L.N.E.R. HALT AT SCOTSWOOD

The L.N.E.R. halt at Scotswood works, first opened in 1915 and dismantled in 1924, is to be re-opened on April 7.

Notes and News

Grimsby Halt to be Closed.—The L.N.E.R. announces that Riby Street halt, Grimsby, will be closed on and from Monday, April 14.

Moscow Underground.—The number of passengers carried on the Moscow underground during 1940 was a record, says Reuters Trade Service. For the calendar year ending December 31 last the underground trains carried 375,000,000 persons; in 1939 the figure was 331,800,000, and in 1938; 212,600,000.

Road Accidents in February.—The number of persons reported to have died in Great Britain during the month of February as a result of road accidents was 689, compared with 741 in January and with 418 in February, 1940. During hours of darkness 353 (against 266 in February last year) accidents occurred resulting in death. Adult pedestrians fatally injured totalled 343 against 262 a year earlier.

C.P.R. Diamond Jubilee.—The Canadian Pacific Railway has recently celebrated another notable landmark in its history—its Diamond Jubilee. On February 15, 1881, the company received its charter to construct a trans-continental line, linking British Columbia with the rest of the Dominion. It was a formidable undertaking; but on November 7, 1885, the last spike was driven at Craigellachie, in the Rockies, by Lord Strathcona (then Mr. Donald A. Smith).

Swedish Private Railways.—The private railways in Sweden (not including those incorporated in the State railway system last summer) report earnings for the month of October, 1940, of Kr. 13,700,000 against Kr. 11,700,000 for October, 1939. Passenger traffic earnings rose by 37.7 per cent. to Kr. 3,800,000 and earnings from goods traffic by 11.2 per cent. to Kr. 9,300,000. It will be remembered, however, that an increase of about 10 per cent. in passenger fares and goods rates came into force on July 1, 1940.

Canadian National Railways.—Gross earnings during February last

were \$20,243,294, an increase of \$2,520,738 and operating expenses were \$17,634,377, an advance of \$1,674,809, leaving net earnings at \$2,609,117 or higher by \$845,929. Aggregate net earnings from January 1 are \$2,324,527 greater at \$5,759,510.

Canadian Pacific Railway.—Gross earnings for February were \$14,107,339 (an increase of \$2,191,920) and expenses were \$11,498,769 \$1,556,000 more. Net earnings at \$2,608,570 were higher by \$636,148 as compared with February, 1940. For the first two months of 1941 gross earnings were \$28,792,000, an increase of \$4,632,000 over the corresponding period of 1940, and the net earnings of \$5,275,000 showed an improvement of \$1,474,000.

Faraday Lecture.—This year's Faraday Lecture to the Institution of Electrical Engineers was given before the North-Eastern Centre on March 12 by Mr. C. E. Fairburn, Deputy Chief Mechanical Engineer & Electrical Engineer, L.M.S.R. Mr. Fairburn took electric traction as his subject and briefly traced development in this country and with recent improvements in equipment and rolling stock. The lecture was followed by a short film showing the operation of multiple-unit traction on the L.M.S.R.

Contracts and Tenders

Caprotti Valve Gears Limited has received an order for two further sets of Caprotti valve gear for the Bengal & North-Western Railway "YB" class engines, making the sixth consecutive order.

The South Indian Railway has placed a contract, to the inspection of Messrs. Robert White & Partners, with Alfred Wiseman & Co. Ltd., for 32 pairs of gear wheels and pinions for electric rolling stock.

Contracts for 625 ballast, ore, and flat wagons have been allocated by the Canadian National Railways to the National Steel Car Corporation, the Eastern Car Co. Ltd., and the Canadian Car & Foundry Co. Ltd. It is stated that 100 refrigerator cars of

40 tons capacity will be built in the Canadian National Winnipeg shops. The National Steel Car Corporation order calls for 150 ballast cars of 50 tons capacity, and 125 80-ton ore wagons. The Canadian Car & Foundry contract is for 200 50-ton flat cars, and the Eastern Car Co. Ltd., a subsidiary of Dominion Steel & Coal Co. Ltd., order is for 250 70-ton hoppers. The manufacture of all the new equipment will be under the supervision of John Roberts, Chief of Motive Power and Wagon Equipment of the system.

British and Irish Railway Stocks and Shares

Stocks	Highest 1940	Lowest 1940	Prices	
			April 1, 1941	Rise/ Fall
G.W.R.				
Cons. Ord. ...	52	22 $\frac{1}{2}$	34	+1
5% Con. Pref. ...	103	58	93 $\frac{1}{2}$	+4
5% Red. Pref. (1950) ...	105	88	102 $\frac{1}{2}$	+3 $\frac{1}{2}$
4% Deb. ...	107	90	110 $\frac{1}{2}$	+3
4 $\frac{1}{2}$ Deb. ...	108	96	112	+4
4 $\frac{1}{2}$ Deb. ...	114	96	115 $\frac{1}{2}$	+2
5 $\frac{1}{2}$ Deb. ...	124	106	124 $\frac{1}{2}$	+2
2 $\frac{1}{2}$ Deb. ...	66	57	66	
5 $\frac{1}{2}$ Rt. Charge ...	117	97	126 $\frac{1}{2}$	+8 $\frac{1}{2}$
5% Cons. Guar. ...	117	90 $\frac{1}{2}$	124 $\frac{1}{2}$	+4 $\frac{1}{2}$
L.M.S.R.				
Ord. ...	24 $\frac{1}{2}$	9	13 $\frac{1}{2}$	+1
4% Pref. (1923) ...	60	21 $\frac{1}{2}$	39 $\frac{1}{2}$	+1 $\frac{1}{2}$
4% Pref. ...	70	35	56 $\frac{1}{2}$	+5 $\frac{1}{2}$
5% Red. Pref. (1955) ...	94	60	84 $\frac{1}{2}$	+3
4% Deb. ...	101	81	102 $\frac{1}{2}$	+1 $\frac{1}{2}$
4 $\frac{1}{2}$ Red. Deb. (1952) ...	109	102	109	+1
4% Guar. ...	93 $\frac{1}{2}$	65	94 $\frac{1}{2}$	+2 $\frac{1}{2}$
L.N.E.R.				
5% Pref. Ord. ...	88	11	23 $\frac{1}{2}$	+1 $\frac{1}{2}$
Def. Ord. ...	48	14 $\frac{1}{2}$	18 $\frac{1}{2}$	—
4% First Pref. ...	60	20	37 $\frac{1}{2}$	+1 $\frac{1}{2}$
4% Second Pref. ...	22 $\frac{1}{2}$	6 $\frac{1}{2}$	13	+1 $\frac{1}{2}$
5% Red. Pref. (1955) ...	80	34 $\frac{1}{2}$	60	+2
4% First Guar. ...	86 $\frac{1}{2}$	56	84 $\frac{1}{2}$	+2 $\frac{1}{2}$
4% Second Guar. ...	77 $\frac{1}{2}$	37	69 $\frac{1}{2}$	+2
3% Deb. ...	73 $\frac{1}{2}$	54 $\frac{1}{2}$	76	+1 $\frac{1}{2}$
4% Deb. ...	97 $\frac{1}{2}$	74	99 $\frac{1}{2}$	+3 $\frac{1}{2}$
5% Red. Deb. (1947) ...	107	96 $\frac{1}{2}$	104	—
4 $\frac{1}{2}$ Sinking Fund Red. Deb. ...	104	98	102 $\frac{1}{2}$	+1
SOUTHERN				
Pref. Ord. ...	79	34	49 $\frac{1}{2}$	+2 $\frac{1}{2}$
Def. Ord. ...	22 $\frac{1}{2}$	7	10 $\frac{1}{2}$	+1 $\frac{1}{2}$
5% Pref. ...	104 $\frac{1}{2}$	58 $\frac{1}{2}$	90 $\frac{1}{2}$	+4 $\frac{1}{2}$
5% Red. Pref. (1964) ...	105	85	100 $\frac{1}{2}$	+6
5% Guar. Pref. ...	116 $\frac{1}{2}$	90	124 $\frac{1}{2}$	+6
5% Red. Guar. Pref. (1957) ...	114 $\frac{1}{2}$	94	112 $\frac{1}{2}$	+3
4% Deb. ...	106 $\frac{1}{2}$	84 $\frac{1}{2}$	109 $\frac{1}{2}$	+2
5% Deb. ...	122 $\frac{1}{2}$	100	125 $\frac{1}{2}$	+2
4% Red. Deb. (1962-67) ...	106	96 $\frac{1}{2}$	106	+2
4% Red. Deb. (1970-80) ...	106 $\frac{1}{2}$	93	106	+2
FORTH BRIDGE				
4% Deb. ...	95 $\frac{1}{2}$	87	93 $\frac{1}{2}$	+2
4% Guar. ...	93 $\frac{1}{2}$	81 $\frac{1}{2}$	91 $\frac{1}{2}$	+2
L.P.T.B.				
4 $\frac{1}{2}$ "A" ...	116	103	118	+3 $\frac{1}{2}$
5 $\frac{1}{2}$ "A" ...	121 $\frac{1}{2}$	107	124 $\frac{1}{2}$	+3 $\frac{1}{2}$
4 $\frac{1}{2}$ "T.F.A." ...	105 $\frac{1}{2}$	101	102 $\frac{1}{2}$	—
5 $\frac{1}{2}$ "B" ...	116	102	113 $\frac{1}{2}$	+3
"C" ...	65 $\frac{1}{2}$	24	31	+1 $\frac{1}{2}$
MERSEY				
Ord. ...	26	18 $\frac{1}{2}$	21 $\frac{1}{2}$	—
4% Perp. Deb. ...	92 $\frac{1}{2}$	86 $\frac{1}{2}$	92 $\frac{1}{2}$	+1
3% Perp. Deb. ...	68	63	62 $\frac{1}{2}$	—
3% Perp. Pref. ...	57	50 $\frac{1}{2}$	53 $\frac{1}{2}$	—
IRELAND				
BELFAST & C.D.				
Ord. ...	4	3	4	—
G. NORTHERN				
Ord. ...	4 $\frac{1}{2}$	1 $\frac{1}{2}$	4 $\frac{1}{2}$	—
G. SOUTHERN				
Ord. ...	12 $\frac{1}{2}$	4	8	—
Pref. ...	15 $\frac{1}{2}$	6	10	—
Guar. ...	36	15	23	—
Deb. ...	55 $\frac{1}{2}$	40	53	—

Irish Traffic Returns

IRELAND	Totals for 11th Week			Totals to Date		
	1941	1940	Inc. or Dec.	1941	1940	Inc. or Dec.
Belfast & C.D. (80 miles)	pass. 2,823	2,260	+ 563	£ 30,497	£ 24,122	+ 6,375
goods 1,011	480	+ 531	11,685	5,486	+ 6,199	
total 3,834	2,740	+ 1,094	42,182	29,608	+ 12,574	
Great Northern (543 miles)	pass. 16,550	13,550	+ 3,000	135,250	100,650	+ 34,600
goods 16,450	11,150	+ 5,300	173,350	126,250	+ 47,100	
total 33,000	24,700	+ 8,300	308,600	226,900	+ 81,700	
Great Southern (2,076 miles)	pass. 42,016	37,979	+ 4,037	368,467	311,377	+ 57,090
goods 46,347	35,098	+ 11,249	549,439	469,049	+ 80,390	
total 88,363	73,077	+ 15,286	917,906	780,426	+ 137,480	
L.M.S.R. (N.C.C.) (247 miles)	pass. 7,410	6,430	+ 980	74,070	43,940	+ 30,130
goods 7,090	3,340	+ 3,750	69,120	36,720	+ 32,400	
total 14,500	9,770	+ 4,730	143,190	80,660	+ 62,530	

OFFICIAL NOTICES

M/9592. Assistant Locomotive Superintendent

EXPORT Engineering Business—Firm of Engineers desire to purchase well established business with overseas connections engaged in engineering and machine trades. Box No. 769, c/o *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

REQUIRED for the Gold Coast Government Railway for two tours of 12-24 months, with possible permanency. Salary £475 rising to £840 a year. Free passages and quarters. Candidates not over 40, must have served an apprenticeship or pupillage in the Locomotive Works of a British Railway or firm of Locomotive Builders and have had subsequent running experience.

Write stating age and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting the

reference number against the appointment for which application is made.

M/9618. Assistant Engineer

REQUIRED for the Federated Malay States Government Railways for 3 years, with possible permanency. Salary \$400—\$25—\$800 a month (dollar equals 2s. 4d.). A children's allowance is payable where applicable. Free passages, and for wife and family, subject to certain conditions. Candidates age 23-35, must hold a Civil Engineering Degree or have passed the A.M.I.C.E. Examination; and have had experience in the maintenance of railway track.

QUESTIONS IN PARLIAMENT

First Class Compartments

Mr. H. W. Butcher (Holland-with-Boston—Lib. Nat.), on March 19, asked the Minister of Transport when instructions were given to the L.N.E.R. that sailors, soldiers, and air force men should be permitted to travel first class when sufficient third class seating accommodation was not provided, and would he have enquiry made as to whether these instructions were observed on the 5.50 train from King's Cross on Friday, March 14.

Lt.-Colonel Moore-Brabazon (Minister of Transport): The instructions were given on July 23, 1940, and I am advised that there is no evidence that they were not observed on the occasion to which my hon. friend refers. The passengers who joined the train were 300 in excess of the seating accommodation available, and arrangements have been made to run a relief train on Friday, March 21.

Mr. Butcher: May I ask the Minister whether he is aware that two naval ratings were removed under the direct supervision of the stationmaster from the carriage in which I was travelling? Will he take steps to prevent this sort of thing happening again?

Lt.-Colonel Moore-Brabazon: Where were they put?

Mr. Butcher: I understand they were turned out on to the platform.

Lt.-Colonel Moore-Brabazon: I will look into the matter.

Canal Transport

Sir Patrick Hannon (Birmingham, Moseley—C.), on March 19, asked the Minister of Transport if he was in a position to make a statement on the result of recent investigation into the development of canal transport; if he could state the number of barges now lying idle at various important centres where transport facilities were an outstanding necessity; and if any special effort was being made to recruit and train crews for the navigation of canal traffic.

Mr. F. Montague (Parliamentary Secretary to the Ministry of Transport): The investigation by Mr. Frank Pick into the carriage of traffic by canal is being pursued energetically and as a matter of urgency, but I am not yet in a position to say when it will be completed. The matters referred to are covered by the investigation, but I should like to make it clear that concurrently with Mr. Pick's enquiries all possible steps are being taken, by re-

conditioning of barges and other means, to enable the canals of this country to make their maximum contribution to the war effort.

Sir P. Hannon: Is the Parliamentary Secretary aware that this question has been neglected shamefully for years, and that it ought to be tackled with energy and rapidity?

Mr. Montague: Yes, Sir, I agree with you; but you will realise that the reconditioning of some canals, not to speak of barges, is an old story, and one of great importance at the present moment.

Sir Stanley Reed (Aylesbury—C.), on March 19 asked the Minister of Transport whether the report of the special officer deputed to inquire into the working of the inland waterways of Britain would be laid before the House and would be open to discussion.

Lt.-Colonel Moore-Brabazon (Minister of Transport) in a written reply stated that Mr. Pick had been appointed to conduct an investigation and report to him. He did not think that it would be appropriate for this report to be laid before the House.

Transport of Straw

Mr. T. Henderson (Glasgow, Tradeston—Lab.), on March 26, asked the Minister of Supply whether he was aware that large quantities of straw for paper-making were being loaded at railway depots in the South of Scotland and carried to East and South England, while the same material for the same purpose was being carried from the South and West of England to paper manufacturers in Scotland.

Sir Andrew Dundan (Minister of Supply) replied that his information was that no paper-making straw had been taken from the South of Scotland to England, but that small quantities had been taken from England to Scotland because of a shortage of straw for paper-making in Scotland. Every effort would be made to reduce transport of paper-making straw to the minimum.

Consignments of Seed Potatoes

Mr. T. Hunter (Perth—C.), on March 26, asked the Minister of Transport whether he was aware that potato growers in England were in dire need of seed from Scotland, and that they were prevented from getting that seed, for land already prepared, by the refusal of railway companies in Scotland to accept consignments of such seed potatoes from Scotland; and whether

he would take the matter up with the railway companies.

Lt.-Colonel J. T. C. Moore-Brabazon (Minister of Transport): I am informed that in view of the large tonnage of seed potatoes to be transported from Scotland to England this year and the pressure on the railway facilities, arrangements were made in agreement with the Minister of Food for seed potatoes consigned to certain counties in England and Wales to be sent by coastal shipping. Consequently an embargo was placed upon the forwarding by rail from Scotland of seed potatoes for these destinations.

Mr. Hunter: Is the Minister aware that there is some doubt as to the amount of coastwise shipping available? Will he make inquiries to ascertain whether there is any shipping and into the fact that at least two great companies are quite willing to extend consignments of seed potatoes but that other railways have refused?

Lt.-Colonel Moore-Brabazon: I will make further inquiries, but I understand from the Minister who is in charge of shipping that there is no trouble about taking seed potatoes. On the rail side, we are carrying over 2,000 tons a night.

Mr. Hunter: Will the Minister make further inquiries into the west coast shipping?

Lt.-Colonel Moore-Brabazon: Certainly.

Parliamentary Notes

G.W.R. (Superannuation Fund) Bill

This was reported, with Amendments, to the House of Commons on March 25 from the Committee on Unopposed Bills (with report on the Bill). The Bill, as amended, and the report were ordered to lie upon the table, and the report to be printed.

G.W.R. (Variation of Directors' Qualification) Bill

This was reported, with amendments, to the House of Commons on March 25 from the Committee on Unopposed Bills (with report on the Bill). The Bill was ordered to be put down for Third Reading; the report to lie upon the table, and to be printed.

Southern Railway (Superannuation Fund) Bill

This was reported, with amendments, to the House of Commons on March 25 from the Committee on Unopposed Bills (with report on the Bill). The Bill, as amended, and report, were ordered to lie upon the table, and to be printed.

Railway Stock Market

Although sentiment was assisted by the war news, most sections of the Stock Exchange have continued under the shadow of the coming Budget, and owing to the inactive conditions, only small movements were shown in most security values. Reinvestment of proceeds arising from the redemption of Indian loans was less in evidence, with the result that British Funds and other high-class investments failed to keep best prices touched during the past few days, although they were again higher on balance for the week. Similar remarks apply to home railway stocks of the prior charge and allied class, but there was very little evidence that the higher prices were attracting profit-taking, and it is probable that the majority of recent buyers regard railway prior charges as permanent investments. In fact, there have been further indications that these stocks are not in large supply in the market; there is general confidence that their investment merits will not be affected by the revision of the financial agreement with the Government. On the other hand, it is generally realised that until the terms of this revision are known, the junior stocks must continue to be viewed as carrying a considerable speculative element, although it would seem that this is more than discounted

by the substantial yields shown at current prices. In fact, the yields on junior stocks of the main-line railways are much above those on shares of many industrial companies not engaged in essential war work, whose earnings will be affected by the plans for concentrating industry and mobilising labour for work of national importance.

Great Western 5 per cent. preference stock has been in continued demand, and as compared with a week ago has further improved from 89½ to 93½, at which the yield still exceeds 5½ per cent. Moreover, Great Western consolidated stock has been marked up from 119 to 124½; while the 4 per cent. debentures were 110½, a gain of three-and-a-half points; and the ordinary stock at 34 was a point better on balance. L.M.S.R. 4 per cent. debentures improved two points to 103, and yield approximately 3½ per cent., which appears attractive when compared with the return on Great Western and Southern debentures. L.M.S.R. guaranteed was 94½, compared with 92 a week ago, at which the yield works out at nearly 4½ per cent., and guaranteed stocks are, of course, cumulative as to dividend. L.M.S.R. senior preference rose from 51 to 56 "middle" and has been obtainable at 57½ to yield close on 7 per cent.; the 1923

preference was 39, compared with 37½ a week ago; while on balance the ordinary stocks improved from 12½ to 13½. L.N.E.R. issues also participated strongly in the upward movement, although as in most other directions, best prices recorded during the past few days were not quite fully held. As regards the debentures, the 3 per cents were 76, compared with 74½ a week ago, and the 4 per cents 99½, compared with 97, at which the approximate yields on these stocks are £3 18s. per cent. and 4 per cent. respectively. L.N.E.R. first preference improved further from 81 to 84½, and the second guaranteed from 68 to 70½. The yield on the last-named still exceeds 5½ per cent. L.N.E.R. first preference moved up from 36½ to 38; while the second preference was a point better at 13½, the very large yield having attracted some buying this week. As regards Southern Railway stocks, the 4 per cent. debentures were higher at 109½; while the 5 per cent. preference advanced on balance from 86½ to 91; the preferred improved from 47½ to 49½; and the deferred from 10½ to 10½. Among Argentine rails, various debentures showed small gains. Elsewhere, San Paulo remained firm on dividend hopes, and Canadian Pacific prior charges continued in demand.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1940-41	Week Ending	Traffic for Week			No. of Weeks	Aggregate Traffics to Date		Shares or Stock	Prices				
			Total this year	Inc. or Dec. compared with 1940			Totals	Increase or Decrease		Highest 1940	Lowest 1940	April 1, 1941		
				1940	1941		This Year	Last Year						
Antofagasta (Chili) & Bolivia	834	23.3.41	£ 18,660	—	2,940	12	£ 200,690	£ 228,750	—	£ 28,060	Ord. Stk.	11½ 3½ 4½ Nil		
Argentine North Eastern	753	23.3.41	ps. 129,400	+ ps. 4,500	38	ps. 5,580,300	ps. 5,785,400	—	— ps. 205,100	6 p.c. Deb.	3½ 5 6½ Nil			
Bolivar	174	Feb. 1941	3,480	—	40	9	6,680	7,220	—	540	Bonds	5 5 5 Nil		
Brazil	—	—	—	—	—	—	—	—	—	—		
Buenos Ayres & Pacific	2,801	22.3.41	ps. 1,956,000	+ ps. 196,000	38	ps. 52,079,000	ps. 52,231,000	—	— ps. 152,000	Ord. Stk.	4½ 1 1½ Nil			
Buenos Ayres Central	190	18.1.41	\$70,400	—	82,200	29	\$2,477,400	\$2,994,900	—	\$517,500	—	—		
Buenos Ayres Great Southern	5,082	22.3.41	ps. 2,791,000	+ ps. 211,000	38	ps. 82,230,000	ps. 90,594,000	—	— ps. 364,000	Ord. Stk.	10½ 3 4 Nil			
Buenos Ayres Western	1,930	22.3.41	ps. 983,000	+ ps. 246,000	38	ps. 28,207,000	ps. 29,285,000	—	— ps. 1,618,000	—	8½ 2 3 Nil			
Central Argentine	3,700	22.3.41	ps. 1,969,400	+ ps. 343,500	38	ps. 58,234,700	ps. 67,715,300	—	— ps. 948,600	—	8½ 2 2½ Nil			
Do.	—	—	—	—	—	—	—	—	Dfd.	4 1½ Nil		
Cent. Uruguay of M. Vides	972	22.3.41	26,580	+	4,203	38	841,468	804,069	+	37,399	Ord. Stk.	32 1½ 1½ Nil		
Costa Rica	188	Dec. 1940	18,694	—	783	26	90,913	107,851	—	16,938	Stk.	23½ 14 15½ 12½		
Dorada	70	Feb. 1941	12,000	+	1,500	9	24,200	22,700	+	1,500	I Mt. Db.	99 97½ 98 6½		
Entre Rios	810	22.3.41	ps. 209,600	+ ps. 25,300	38	ps. 8,165,200	ps. 9,217,500	—	— ps. 1,048,300	Ord. Stk.	4 1½ 1½ Nil			
Great Western of Brazil	1,016	22.3.41	10,100	—	100	12	125,800	159,500	—	23,700	Ord. Stk.	4 1½ 1½ Nil		
International of Cl. Amer.	794	Jan. 1941	\$499,099	—	\$66,391	4	\$499,099	\$565,490	—	\$66,391	—	—		
Interoceanic of Mexico	—	—	—	—	—	—	—	—	—	—	1st Pref.	9d. 9d. ½ Nil		
La Guaira & Caracas	228	Feb. 1941	7,350	+	355	9	13,475	14,605	—	1,130	—	—		
Leopoldina	1,918	22.3.41	27,675	+	7,695	12	287,866	265,046	—	22,820	Ord. Stk.	2½ ½ Nil		
Mexican	483	7.2.41	ps. 270,300	- ps. 46,500	5	ps. 1,586,200	ps. 1,652,800	—	— ps. 66,600	—	2/1 ½ ½ Nil			
Midland of Uruguay	319	Jan. 1941	12,385	—	321	30	81,797	68,384	—	13,413	—	—		
Nitrate	386	15.3.41	2,890	—	4,529	11	20,499	42,211	—	21,712	Ord. Sh.	2½ 1½ 2 6½		
Paraguay Central	274	22.3.41	ps. 271,900	- ps. 237,000	38	\$123,672,000	\$121,418,000	—	— \$2,254,000	Pr. Li. Stk.	41 36 30 ½ 19½			
Peruvian Corporation	1,059	Feb. 1941	55,812	—	11,111	35	516,957	531,913	—	14,956	Pref.	4 1 2 Nil		
Salvador	100	18.1.41	ps. 20,895	- ps. 14,772	29	—	—	—	—	—	—	—		
San Paulo	153½	16.3.41	35,250	—	1,861	11	374,750	383,297	—	8,547	Ord. Stk.	50 23 33 7½		
Talat	160	Feb. 1941	3,075	+	745	35	22,510	20,130	+	2,380	Ord. Sh.	15/1 ½ ½ Nil		
United of Havana	1,346	22.3.41	48,869	—	2,354	38	795,241	852,812	—	57,571	Ord. Stk.	—		
Uruguay Northern	73	Jan. 1941	1,153	+	30	30	8,233	7,384	+	849	—	—		
Canadian	23,637	21.3.41	1,050,725	+	232,950	12	11,353,080	9,500,356	+	1,852,724	—	—		
Canadian National	—	—	—	—	—	—	—	—	—	—	4 p.c.	Perp. Dbs.		
Canadian Northern	—	—	—	—	—	—	—	—	—	—	105½	105½ 101 3½		
Canadian Pacific	17,153	21.3.41	779,300	+	254,800	12	7,968,600	6,405,600	+	1,563,000	Ord. Stk.	9½ 4½ 8 Nil		
Assam Bengal	1,329	30.4.40	45,187	+	6,529	4	135,060	120,437	+	14,623	Ord. Stk.	99½ 71 100 3		
Barsi Light	202	20.1.41	4,477	+	1,672	43	128,685	104,017	—	24,668	—	—		
Bengal & North Western	2,086	28.2.41	271,125	—	2,964	22	1,281,323	1,196,608	—	84,715	Ord. Stk.	283 234 295 5½		
Bengal Dooms & Extension	161	Sept. 1940	14,625	—	508	26	78,405	66,243	—	12,162	—	—		
Bengal-Nagpur	3,269	31.12.40	284,550	+	15,859	39	6,543,848	5,895,495	—	648,353	—	96 83½ 99½ 4		
Bombay, Baroda & Cl. India	2,986	20.3.41	328,500	+	40,200	51	10,049,700	8,902,800	—	1,146,900	—	103 97½ 103½ 7½		
Madras & Southern Mahratta	2,939	10.1.41	174,225	+	8,269	41	4,728,299	4,450,847	—	277,452	—	104 97½ 103½ 7½		
Rohilkund & Kumaon	571	28.2.41	57,600	—	1,989	22	269,465	252,386	—	17,079	—	284 238 290 5½		
South Indian	2,542	31.12.40	141,648	+	8,811	39	3,420,638	3,075,356	—	345,282	—	93½ 83 96½ 4½		
Beira	204	Jan. 1941	76,256	—	—	17	284,761	—	—	—	—	—		
Egyptian Delta	623	20.12.40	9,626	+	2,520	38	169,255	155,708	+	13,547	Prf. Sh.	7/10½ ½ Nil		
Kenya & Uganda	1,625	—	—	—	—	—	—	—	—	—	4 p.c. Gar.	—		
Manila	—	—	—	—	—	—	—	—	—	—	E. Deb.	53 44½ 47½ 7½		
Midland of W. Australia	277	Nov. 1940	15,716	+	4,027	22	78,885	63,495	+	15,390	Inc. Deb.	88 80 87½ 6½		
Nigerian	1,900	25.1.41	55,111	—	18,846	43	1,788,795	1,602,531	—	186,264	—	—		
Rhodesia	2,442	Jan. 1941	491,762	—	—	17	1,928,021	—	—	—	—	—		
South Africa	13,287	18.1.41	773,368	+	99,078	42	29,030,638	27,144,961	+	1,885,677	—	—		
Victoria	4,774	Aug. 1940	838,289	+	190,022	9	1,756,717	1,383,157	—	373,560	—	—		

Note. Yields are based on the approximate current prices and are within a fraction of ½.

Receipts are calculated at £s. 6d. to the rupee.

Argentine traffics are now given in pesos